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The

Practical Medicine Series

COMPRISING EIGHT VOLUMES OF THE YEAR'S PROGRESS IN MEDICINE AND SURGERY

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OBSTETRICS

PREGNANCY

Physiology

The Corpus Luteum as the Source of the Follicular Hormone. The corpus luteum has been cited as the source of the hormone which produces hyperplasia of the genital tract and some authors claim that extracts made by extracting corpus luteum with lipoid solvents are able to cause growth in the genital tract of certain mammals. The amount of care exercised in collecting material is a factor which must be considered in order to be sure of the type of tissue obtained.

Using rats and rabbits, C. G. Johnston and V. L. Gould[1] were unable to produce any noticeable changes in the genital tract by the injection of the alcohol, ether, acetone extract of carefully collected corpora lutea from pigs. Pregnancy of the animals from which the corpora lutea were gathered, the size, consistency, or color of the corpora lutea had no effect on the results obtained.

The authors obtained repeated positive tests with the alcohol, ether, acetone extract of liquor folliculi of hog ovaries and in view of this are inclined to believe that the corpus luteum does not secrete the hormone which produces hyperplasia of the uterus and vagina.

[Frank and Goldberger in their most recent contribution to this subject have found the "female sex hormone" in the liquor folliculi of normal ovaries, in the corpus luteum and in the placenta. Its presence can also be demonstrated in the blood up to the time menstruation begins, and during pregnancy.—Ed.]

Examination of the Calcium Regulation During Pregnancy. From a study of the blood of fourteen

(1) Surg. Gynec. & Obst., February, 1926.

pregnant women, G. Hetenyi and S. Liebmann[2] conclude that there is a diminution in the calcium content of the serum toward the end of pregnancy. The calcium which is in the blood of pregnant women is quickly taken up. This avidity may be due first to the calcium requirements of the fetus, and secondly, to a special affinity of the cells of the gravid woman. In a few cases there appear to be an increased renal permeability to calcium. The blood of the umbilical vein contains more calcium than that of the artery.

[These results are at variance with those of Plass.—Ed.]

Plasma Protein Fractions in Normal Pregnancy, Labor and Puerperium. According to E. D. Plass and C. W. Mathew[3], the total plasma proteins tend to be diminished during pregnancy and the early part of the puerperium. This is due to a watery dilution of the blood.

The serum-albumin is diminished to such an extent that the fall of total proteins can be attributed to the reduction in concentration of this fraction. The relative decrease is slight. The serum-globulin undergoes a slight relative increase, although the absolute values remain practically constant. The fibrin (fibrinogen) rises during pregnancy to reach a high point shortly after delivery. The relative increase is greater than the absolute change. This phenomenon may be regarded as a protective mechanism designed to prevent excessive hemorrhage during labor. The postpartum increase in fibrin is probably due to birth trauma.

The Influence of Menstruation and Pregnancy on the Permeability of the Meninges. R. Benda[4] verified the findings of Heelig that there is an increased permeability of the meninges at the beginning of menstruation. This is probably due to a hormone. Since the

(2) Med. klin., Dec. 18, 1925.
(3) Am. J. Obst. & Gynec., September, 1926.
(4) München. med. Wchnschr., Oct. 2, 1925.

hormonal influence is much greater during pregnancy, Benda studied the permeability in 25 women early in pregnancy and in 100 women late in pregnancy. Three methods were used, the uranin, the Weil-Kafka hemolysin reaction, and the Walter bromin method. In the first half of pregnancy no change in permeability was found. However, in the second half of pregnancy and especially during labor there was a markedly increased permeability in most of the cases studied. The increase is more frequent and more pronounced in primiparas. The return to normal did not occur until four to six weeks after labor. In the presence of toxemia of pregnancy the permeability was greater than is usual during pregnancy. The barrier which is broken down is most likely the wall of the meningeal blood vessels. If this be true then this injury to the meningeal blood vessels is only part of a generalized injury to the capillary endothelium of the body, which Volhard, Farr, and others believe to be the cause of edema in pregnant women. Since the capillary system is an essential part of the reticulo-endothelial cell system which plays an important rôle in the protective mechanism of the patient, it appears that this protective mechanism can under certain conditions be unable to function.

A Study of Döderlein's Vaginal Bacillus. In 1892, Döderlein first described the vaginal bacillus as a long, thick, nonmotile, gram-positive bacillus occurring in the normal vaginal secretions. Döderlein considered the antagonistic action of the vaginal bacillus on the growth of staphylococci, and the bactericidal action of the vaginal secretions to be due to the lactic acid produced by the bacillus.

Since the presence of Döderlein's bacillus is an index of normal vaginal secretions, Apel divided the vaginal flora in pregnant women near term into three grades of purity based on the incidence of the bacillus. He considers the factors that counteract the influence of the vaginal bacillus in favor of pathogenic invaders to

be birth trauma, alkaline lochial flow, and a gaping vulva which is a deficient barrier.

The material for a study by A. F. Lash and B. Kaplan[5] was obtained from the pregnant women coming to the Cook County Hospital Pre-natal Clinic, and from women at term awaiting labor in the hospital. This source of Döderlein's bacillus was thought to be desirable, as 50 per cent. of women have normal vaginal secretions during the last few weeks of pregnancy.

Details are given in regard to 98 pregnant women whose vaginal secretions were cultured. Döderlein's vaginal bacillus was identified in smears in 42 per cent., and cultivated in 13 per cent., of the vaginal secretions from pregnant women. The results do not disagree with those of other investigators except for the low incidence in cultures. Failure to cultivate in a greater number of cases was probably due to more rapid growth of the associated organisms. The morphology, cultural characteristics, biochemical, pathogenic properties and immunological reactions of four strains were studied; three could be classified under the general group of lactobacillus, while one resembled a diphtheroid. Serologically, they are distinct but there may be some relationship.

The conclusions of the authors are as follows:

The term Döderlein's vaginal bacillus includes a large group of organisms which, though related, have some differentiating characteristics. This fact makes it difficult to classify them. Among the mediums used the most favorable for cultivating these organisms was found to be 1 per cent. lactose in neutral broth. Lactobacillus vaginae, a provisional name for the Döderlein strain B studied has never been previously described. The exacting cultural requirements and the incidence of the organisms in the normal vaginas of new-borns and adults are facts upon which the hypothesis is based that the Döderlein's vaginal bacillus

(5) J. Infect. Dis., April, 1926.

has a function in inhibiting the growth of pathogenic organisms by direct action or by maintaining certain conditions in the vagina by its action on the vaginal mucous membrane. The associated organisms are not so virulent as when they occur in the pharynx.

Vaginal Bacilli. R. Tateyama[6] found that vaginal bacilli are present in large numbers or in pure culture in the vaginas of 90 per cent. of healthy, pregnant women during the first and second months of pregnancy. With the advance of gestation the vaginal bacilli become less numerous. In the fifth month only 50 per cent. of the patients show the first degree of cleanliness (vaginal bacilli and many epithelial cells). In the seventh month only 25 per cent. and in the last month practically no patients show the first degrees of cleanliness. This change is due to external factors, such as gaping of the vulva and increased secretion. For this reason the contents of the vagina can easily be contaminated. In pregnant women who have genital infections and in nonpregnant women the first degree of cleanliness is not found. With the advent of pregnancy the vaginal bacilli find a more favorable medium in which to grow.

From this study the author concludes that when the first degree of cleanliness is found pregnancy should be suspected. If in addition one or more menstrual periods are missed the diagnosis of pregnancy is fairly certain. In the differential diagnosis between extrauterine pregnancy and adnexal tumor the former will be the correct diagnosis if vaginal bacilli are found in large numbers in the vagina.

(The second degree of cleanliness is present when in addition to vaginal bacilli and epithelial cells, there are other bacilli, cocci and leukocytes; the third degree when no vaginal bacilli are present, only pus cells and other micro-organisms.)

(6) Monatschr. f. Geburtsh. u. Gynäk., November, 1925.

[The quality of the vaginal secretions depends on so many factors that a book the size of the Year Book could be devoted to the subject. Habits of personal cleanliness, the husband's health and hygiene, the general constitution of the woman, the state of her vulva, cervix, uterus, tubes, as regards infections; all these, in addition to accidental factors have direct and indirect bearing on the vaginal secretions and their flora. Lack of space forbids any discussion here, only this must be said, —in a few cases the vaginal tract harbors bacteria which may be dangerous to the health or life of the parturient. —Ed.]

Blood Pressure and Urinary Findings in 100 Cases of Normal Pregnancies. There were made by F. A. Faught[7] in this series, 600 blood pressure observations and 675 urinalyses. Of the 675 urinalyses, 309 or 44.1 per cent. showed albumin alone or with other urinary abnormalities.

The author's conclusions are as follows: There is practically no difference in the average blood pressure values in the primipara, as compared with the multipara. There is a slightly greater tendency for primiparae to show urinary abnormalities, which, however, does not appear to have any great significance. We may expect to find a high incidence of albumin in the urine of pregnant patients associated in many instances with casts and red blood cells. The influence of these abnormalities on the average blood pressure findings is insignificant and well within recognized normal variations. The persistent occurrence of albumin and other urinary abnormalities usually has little significance. Individuals, not infrequently, show marked abnormal variations in systolic pressure both below and above the normal limits, the occurrence of which does not necessarily indicate impending grave metabolic disturbances or toxic states. The occurrence of glucose and indican as complicating factors during pregnancy

(7) Am. J. Obst. & Gynec., May, 1926.

must be taken into consideration since their incidence is comparatively frequent, and may be associated with comparatively great blood pressure abnormalities in the individual case. Their significance and effect upon the pregnant woman is probably no greater than the other urinary abnormalities. The mere elevation of systolic blood pressure does not indicate the approach of grave complications unless persistent, under which condition further light should be sought by a study of the blood for the detection of nitrogen retention and disturbance in the CO_2 combining power of the blood.

[The Editor has had numerous cases where a simple moderate (140-150) elevation of blood pressure, without albuminuria and without symptoms of toxemia, was present. Some of these women went through pregnancy successfully to term but they always, sooner or later, presented some small symptom which gave rise to concern on my part. A few of them developed marked symptoms of toxemia and had to be decisively treated. Therefore, I believe the authors give a false sense of security in this article. High blood pressure is probably due to some change in the capillary system and points to disturbance in a structure whose perfect integrity is necessary for life.]

Pregnancy, Parturition and Health after Surgical Replacement of the Uterus—a Retrospect. This paper is based upon a systematic follow-up of 377 selected gynecological patients who were operated upon at the Philippine General Hospital between the years 1909 and 1922 inclusive, so as to allow a reasonably sufficient time for observation, with an average duration of eight and one-half years since the operation.

The replacement of the uterus was only one of several procedures adopted for the purpose of curing or relieving various disorders, chiefly pelvic, but its nature was singled out in the title because it was the one procedure employed in each and every case. The actual number of patients operated upon for displacements of

the uterus alone constituted a small proportion—only 16 per cent.—much too small to be of value, either statistically or otherwise.

The effort to follow up these patients by C. Reyes[1], extended for the last eight months and was successful in 49 per cent. of them (173).

The operations, the remote effects of which were studied, do not appear to have affected pregnancy, parturition and health unfavorably, but quite the contrary. In fact, of the patients who reported to have had abnormal parturition after operation, few needed actual medical assistance with occasional use of forceps; the reported abnormalities consisted in the majority of cases of relatively prolonged or painful (difficult) labors, not oftener than are usual among ordinary parturient women.

A large number of patients is reported to be doing well or enjoying better health among those who continued or commenced bearing than those who ceased bearing children after operation (71 against 54 per cent.).

Venereal history, salpingitis and adhesions were found to be proportionately much more frequent among patients who ceased bearing children than among those who continued or commenced bearing them after operation (59 against 20 per cent.).

Pregnancy in Uterus Didelphys. P. Findley[2] collected from the literature and personal correspondence, 132 cases of uterus didelphys, to which he has added three of his own, making a total of 135 cases. All represent a complete doubling of the uterus, cervix, and vagina and all have been pregnant.

In the 135 cases there were 217 full-term babies born; 83 spontaneous deliveries, 23 cesarean sections, 1 craniotomy on a dead fetus, 2 Porro operations, 1 hemihysterectomy and 1 death from rupture of the uterus;

(1) Surg. Gynec. & Obst., September, 1926.
(2) Am. J. Obst. & Gynec., September, 1926.

22 cases were delivered by forceps or version and extraction. In the 135 cases there were: Six deaths, 13 twin pregnancies, 15 premature deliveries, 86 abortions, 2 malformations of the baby, and 13 breech presentations.

The author concludes that the uterus didelphys is compatible with a normal sexual life save in exceptional instances, and that the anomaly is often unrecognized even in event of childbearing.

Unusual fertility is demonstrated in many cases. Abortions are relatively common and labor is prolonged as a result of poor muscular development in the uterus, small rigid cervix, and the encroaching nonpregnant uterus. Errors in diagnosis have been frequent, due to the difficulty in recognizing the nongravid uterus in advanced pregnancy and the occasional recurrence of menstruation throughout pregnancy.

The behavior of the nonpregnant uterus is of interest in that it may contribute to the labor pains by its contractions, the cervix may dilate and very commonly a decidual membrane is expelled on the second or third day of the puerperium. Its greatest interest centers in the fact that it not infrequently retards the progress of labor by becoming incarcerated in the hollow of the sacrum. The management of pregnancy and labor in the uterus didelphys should not differ from that of pregnancy in the normal uterus save in the event of complications. Spontaneous delivery is the rule. In the event of delayed labor due to an impacted nongravid uterus that cannot be dislodged, cesarean section is indicated.

Weight Estimates During Pregnancy and the Puerperium. It has interested W. Kerwin[3] to watch the increase in weight during the different trimesters and the decrease that takes place during the first two weeks following delivery and the decrease that occurs during

(3) Am. J .Obst. & Gynec., April, 1926.

the normal puerperium. Several hundred records of cases coming to the Cass Avenue Prenatal Clinic were reviewed to obtain the following data: The average gain from the end of 12 weeks to the end of 24 weeks in 260 cases was 8½ pounds. The average gain from the twenty-fourth week to the end of pregnancy in 127 cases was 7½ pounds. The average gain from the third month of pregnancy to the end in 147 cases was 16½ pounds. The average loss during the 6 weeks following delivery in 152 cases was 16⅓ pounds.

The figures indicate that the loss for the first two weeks following delivery is greater than during the six weeks following delivery; in other words, the patient regains some of the weight loss which must be attributed to the inactivity of the body while at rest in bed.

When the weight was excessive for the height of the patient, diet was instituted with the hope of controlling the gain as far as possible. In private practice with the patient under better control this could be accomplished in practically all cases. It was apparent that the patient felt decidedly better if the weight gain was kept low, providing the initial weight was above par.

A summary of the author's facts and the work of others force the following conclusions: Obesity is pathologic in pregnancy as well as in the nonpregnant state. It can and should be controlled through diet and exercise. Excessive weight gain is detrimental to both mother and child. The weight gain is about equal in the second and in the third trimesters. (The rapid gain in the second trimester is probably due to the fact that the patient enters the second trimester with a weight below normal, brought about by the disturbance in digestion which frequently exists in the first trimester.)

The weight loss for the puerperium about equals the weight gain made during pregnancy. The greatest loss

occurs during the lying-in period, and this loss is not due solely to the loss of the ovum. More consideration should be given to the future health and physique of the pregnant woman. Improvement in these conditions can be obtained through the control of pregnancy fat.

[Excessive gain of weight during pregnancy usually occurs in women who are endocrinopathic, and this increase of fat is likely to continue after delivery. Unless the obesity is marked, the Editor does not prescribe a special diet or a great amount of exercise. The thyroid gland is investigated, and treated if necessary, and if the patient habitually overeats, this propensity is curtailed.]

A Study of the Contour Abdominal Measurement of Pregnancy. The purpose of this paper is to record a study of the contour abdominal measurements of pregnant women in regard to estimating the probable date of labor.

G. F. Pendleton[4] collected a large mass of material in and around the regions of Kansas City, which totals 5,500 cases with 22,500 measurements.

From a study of 4,198 of these cases and 1,209 additional private cases, Pendleton concludes that labor can be predicted in a reasonable number of times by means of abdominal contour measurements, provided extreme care is used in eliminating the many possible factors which easily cause great error in results. Such a method is dependable and as accurate as Naegele's rule after the twenty-fourth week and should be used in conjunction as an arbitrary check to that rule or when the menstrual history has been peculiarly unusual.

Accuracy of prediction depends upon the fetal position and attitude in utero, being more reliable in left-sided vertex positions and those cases coming earlier than Naegele's rule are more accurate than the ones occurring later. Posterior vertex positions are very unreliable and subject to great variability. Certainly

(4) Am. J. Obst. & Gynec., September, 1926.

no decision as to the method of procedure in an unusual posterior position should be decided by such measurements. Abnormalities of pregnancy and labor present larger measurements than normal, while careless measuring, lightening, uterine contractions and uterine suspensions, generally give smaller ones. Undermeasurements are more valuable than overmeasurements because of less chance of error and measurements during labor are unreliable. The uterus in gestation has a definite regular rate of growth throughout pregnancy.

This rule and abdominal contour measurements are of value only to those who use them daily and practice the art of obstetrics rather than occasional midwifery.

[The Editor will acclaim with joy any reliable method which will enable him to predict the day of confinement. Any method which has to eliminate uneliminable factors is not to be fully relied upon. How does the author evaluate the amount of liquor amnii, the variable contours of the uterus, the amount of feces in the colon, the projection of the spinal column, the size of fibroids, etc., etc.?]

An Investigation into the Causation of the Onset of Labor by Parabiosis During Pregnancy. With all our modern advances, we are as much in the dark regarding the factor responsible for the onset of labor as was Hippocrates. Of late there has been brought forward the hypothesis that labor is an anaphylactic phenomenon. Up to the present time, this is apparently the most logical theory, and, while not proved, has at least some apparently rational basis for its existence.

Owing to the inconstant and rather unsatisfactory relationship between the conclusions of the various authors and their actual findings, as described in their protocols, I. Kross[5] decided to perform a series of para-

(5) Am. J. Obst. & Gynec., January, 1926.

biotic experiments and note the effect, if any, that labor had upon pregnant animals.

Fully mature pregnant rats were employed. An artificial parabiosis (Siamese twins, so to speak) was produced. This was done by making a flank incision through the entire thickness of the abdominal wall, opening into the peritoneal cavity from the last rib above to the pelvis below. A similar incision was made in the second animal on the opposite side. The two animals were now united by the same technic employed in performing an intestinal anastomosis. The peritoneum and muscle were united as one layer, the fascia as a second and the skin as a third. When completed, the two animals possessed a common peritoneal cavity. In every instance the two animals were so selected that the gravidity was distinctly more advanced in the one than it was in the other. Each pair of animals was kept in its own cage.

Eleven pairs of pregnant rats were united in parabiosis. Pairs No. 2 and 3 died before the animals went into labor. Of the remaining 9 pairs, all except No. 10 went into labor at the usual time at the termination of their respective periods of gestation. The animal less advanced in pregnancy continued to the end of its normal gestation period without being in the slightest degree affected by the labor of its partner. In pair No. 10 both animals littered at approximately the same time.

The author concludes that fascinating as is the theory of labor as an anaphylactic phenomenon, and logical as are the theoretic assumptions made in its behalf, the results of these experiments have shown that in the rats employed, no labor-inducing substances are produced during labor that have any appreciable influence upon the course of pregnancy in the partner of a parabiotic pregnant pair.

[Q. E. D. for rats, and probably for humans, too.—Ed.]

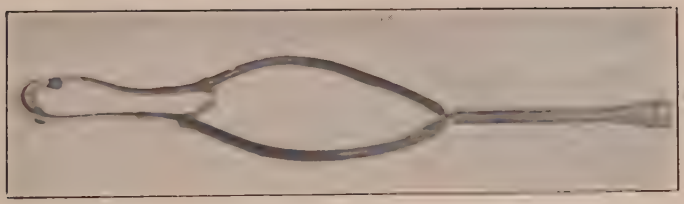
Heart Output During Pregnancy. From experiments performed upon six female dogs, two of which became pregnant, H. J. Stander, E. E. Duncan, and W. E. Sisson[6] conclude that the minute volume of the heart has a far more constant value than the systolic output. The cardiac output of the nonpregnant dog varies only within slight limits. During pregnancy the minute volume is markedly increased, being one-third to one-half greater than before. Following labor the minute volume gradually falls and regains the nonpregnant value within 2 to 3 weeks. During the estrus cycle the studies indicate that changes occur similar to those in pregnancy, but to a slighter degree. Whether or not the increased output in pregnancy is the result of hypertrophy of the heart has not been determined, but it appears probable that, at least in part, it is accomplished by drawing upon the reserve force of the heart. For this reason, it would seem that before expressing a prognosis in cases of pregnancy complicated by abnormalities of the heart, one should always attempt to evaluate the reserve force of the heart. A direct method for determining the cardiac output in women would enable us to make an intelligent prognosis in cases of pregnancy complicated by heart disease; but until a suitable method becomes available, we shall have to be content to base our prognosis upon the available clinical data.

The Use of the Vaginal Stethoscope in the Early Diagnosis of Pregnancy. It would seem desirable if some method could be devised to promote the hearing of the fetal heart tones before the eighteenth week.

With this idea in mind, F. H. Falls[7] devised a stethoscope that could be applied over the lower uterine segment through the vagina. This was accomplished by making a long-handled stethoscope, the bell of which could be introduced into the vagina and the earpieces

(6) Am. J. Obst. & Gynec., January, 1926.
(7) Am. J. Obst. & Gynec., March, 1926.

PLATE I.



A

B

A.—Vaginal stethoscope with ordinary stethoscope earpieces attached.

B.—Counting fetal heart rates by means of vaginal stethoscope. The patient is in the semi-Fowler position.—Falls, page 20.

attached to the rubber tubes of an ordinary Shepherd stethoscope. (Plate I.)

By using this instrument the author has been able to diagnose pregnancy about the fourteenth to sixteenth week in twenty patients. In order to facilitate this position of the fetus in utero, he placed the patient in the Fowler position when the tones became audible in practically all cases.

Another use to which the vaginal stethoscope may be put is the auscultation of the lower uterine segment, in patients with placenta previa. At or near term there is audible a uterine souffle on both sides of the midline in the lateral fornices in normal cases. However, this normal uterine souffle was decidedly increased in two patients with low implanted placenta in whom he could observe it even in the early months. Further study of this point is in progress.

The vaginal stethoscope is of practically no value for hearing heart tones after the twentieth week. The reason for this is that the uterus has risen so high into the abdomen at this stage of development and the fetus is so large that the distance of the heart from the lower uterine segment is too great whether a head or a breech presentation is present. Theoretically this instrument would be of value in confirming the diagnosis of a transverse presentation especially in a very stout abdomen if the tones were well heard vaginally at or near term. The author has not as yet had an opportunity to study such a case.

From a consideration of certain factors it may be stated as a physical law that the audibility of the tones of a heart of a certain size producing a tone of a certain pitch and intensity will vary inversely as the distance between that heart and the stethoscope and as the density and thickness of the interposed structures.

The author concludes that the vaginal stethoscope advances the time of hearing and counting the fetal

heart tones about four weeks, therefore making this sign precede quickening. It is of some value in the diagnosis of placenta previa. The instrument is of especial value in patients with a very thick abdominal wall offering difficulties in abdominal auscultation. It is of value in the diagnosis of the death of the fetus in early pregnancy. It is of aid in the diagnosis of mole pregnancy and in determining the presence or absence of pregnancy complicating uterine fibroids. Fetal movements as well as the fetal heart tones can be heard vaginally in the early months and are a valuable aid in the confirmation of the diagnosis of early pregnancy.

[At the suggestion of the Editor, the Western Electric Company, several years ago, made an electric amplifying stethoscope for hearing the fetal heart sounds. The microphone is placed at the end of a bent tube which is pressed against the anterior vaginal wall, and the uterus pushed down by a sandbag placed on the abdomen. The experiments are still under way. Falls' instrument is much simpler, though not quite as esthetic, and perhaps more useful.]

The Defensive Mechanism of the Parametrium During Pregnancy and Labor. A series of 43 specimens of the base of the broad ligament and the outer layers of the uterine wall was submitted to microscopic examination by J. Hofbauer[8]. These were in part obtained from the collection of the obstetrical department of the Johns Hopkins Hospital and in part consisted of fresh specimens obtained at operation during the current year. In addition, several specimens obtained by the courtesy of the gynecological department afforded the material necessary for the study of the parametrium under normal nonpregnant conditions.

The study demonstrated that during pregnancy a phagocytic tissue, consisting of monocytes and clasmatocytes, makes its appearance in the base of the broad

(8) Bull. Johns Hopkins Hosp., April, 1926.

ligament, and is intensified under the stress of prolonged labor but particularly by the existence of infection. The development of this tissue from resting-wandering cells and adventitial cells can be demonstrated.

The presence of this phagocytic tissue in the parametrium must be regarded as a prophylactic biological reaction and as a marked protection against infection. It certainly affords a mechanism for the development of local immunity in a region abundantly predisposed to infection, and must be of service in doing away with debris and bacteria.

The mode of its production is not yet clear, but it may have important implications in connection with the questions of autoinfection and low cervical section.

The development of lymphoid tissue within the walls of lymphatics in the parametrium must be regarded as an additional defensive mechanism.

[We have long thought that there must be a local defensive mechanism around the cervix—look at the insults it bears in daily practice.—Ed.]

The Normal and Pathologic Physiology of Pregnancy. During the week preceding the menstrual flow ovarian hormones initiate profound biologic changes, not only in the genitalia but throughout the organism, which definitely manifest the consistent and propitious preparation of woman for impregnation. They necessarily are in evidence at the moment of the implantation of a fertilized ovum. According to H. Ehrenfest[9], it is therefore unjustifiable to explain any of these biologic changes as due to some foreign protein, cytolysin or any other factor dependent upon the implantation process. They are due alone to ovarian hormones. Changes, primarily the result of cyclic ovarian function, during pregnancy are modified, and others added as gestation progresses.

(9) Am. J. Obst. & Gynec., July, 1926.

The widespread and varying morphologic, chemical and functional alterations, which characterize the normal physiology of pregnancy, express the gradual adaptation to exigencies created by pregnancy. These requirements consist chiefly in qualitative and quantitative needs of the fetus for building materials and energy, and for adequate disposal of end-products of fetal metabolism and of other chemically active substances passing from fetus to mother. Later in pregnancy, adjustment is required to certain topic derangements within the abdominal cavity caused by the enlarging fetus and uterine tumor.

In the constitutionally normal and healthy woman this necessary adaptation will be fully achieved. She will continue during pregnancy in a state of health.

In the woman who is constitutionally deficient, or in whom certain organs or organ systems through premature arrest of postfetal development or through preceding disease have become unable to respond with an increase of function to an increase of demands, adjustment is likely to be accomplished only slowly or imperfectly. Inadequate adjustment manifests itself in symptoms and clinical findings which in the nonpregnant individual always indicate a truly pathologic condition. They constitute the pathologic-physiology of pregnancy, best and most often expressed in clinical pictures commonly described as the toxemias of pregnancy.

Additional structural changes during pregnancy and the strain of greatly increased functional activity may impair an already injured organ to such an extent that complete restitution later becomes impossible. This transition of pathologic-physiologic changes into actually pathologic conditions, this transgression over the always indistinct borderline between merely temporary disturbance and true disease, as a rule is gradual. Often the fact that this change actually has occurred

cannot be established until some time after pregnancy has ended.

Pregnant women, better and more conveniently than sick individuals or animals in laboratory experiments, offer most favorable opportunities for following step by step the development of structural and functional derangements in all the larger parenchymatous organs and especially the endocrine glands, and for observing in their incipience certain disturbances of general or special metabolisms. A clearer understanding of the specific stimuli and conditions which, during pregnancy, lead to all these marked alterations, could not fail to enlighten us also concerning the primary causes of various diseases or concerning those specific conditions under which slight impairment of one kind or another is likely to develop into actual disease.

The assumption seems justified that, with further addition to our knowledge concerning the general biologic effect of cyclic ovarian activity, a careful analysis of the premenstrual reactions of the individual woman might enable us to predict with some certainty how, at some later date, she is likely to adjust herself to the demands made by a pregnancy.

The Treatment of Female Sterility. In about one-third of the cases of sterility the male is at fault and in another one-third the woman is to blame but only because of disease contracted from the husband. Hence in only one-third of the cases is the woman basically to blame for sterility. Among every one hundred women who have no children during the first two years of married life only 49 subsequently have children.

Of 326 patients who were operated upon for sterility at the Marburg Clinic, 259 were traced by G. Schwarz[1], and of this number 89, or 33 per cent. became pregnant after the operation. The latter consisted of dilating the cervix, curettement, irrigation of the uterus with sodium chlorid and incision of the posterior lip of the

(1) Monatschr. f. Geburtsh. u. Gynäk., December, 1925.

cervix. A metal tube was then inserted to maintain the patency of the cervix and this was left in place for five to six days. On two occasions the uterus was perforated and perhaps also in a third case. All three patients recovered and one of these had two normal pregnancies subsequently.

Among 58 patients with normal genitalia who became pregnant after operation 16 miscarried but 11 of these later had full-term pregnancies. Among 23 patients with hypoplasia, 4 became pregnant after the operation (17.4 per cent.). Among 58 patients who had an Alexander-Adams operation in addition to the above procedure (with omission of the metallic tube), 24 became pregnant after operation (41.4 per cent.). Eight of these women had abortions, but five of them subsequently had full term pregnancies.

The Present Status of the Methods Used to Test Tubal Patency. D. v. Ott[2] considers the Rubin test and its modifications a dangerous procedure and therefore has never used it. In its place he injects into the peritoneal cavity an indifferent powder dissolved in salt solution. If the tubes are open these particles of powder may readily be seen in the cervical canal in about 24 hours. This test was performed in only six cases. The method is simple and requires no special apparatus and has no dangers such as peritonitis, embolism and emphysema.

Frommolts operated upon 29 patients in whom tubal patency tests had been performed and found that the diagnosis as made from these tests was wrong in 50 per cent. of the cases. In some cases reported as having patent tubes, the latter were closed and in the form of a sactosalpinx. In some cases reported as having closed tubes the latter were open.

Tubal Peristalsis and the Influence of Pharmacological Substances on Spontaneous Activity. F. Kok[3] per-

(2) Monatsch. f. Geburtsch. u. Gynäk., October, 1925.
(3) Med. Klinik, Nov. 6, 1925.

formed experiments on 140 human and animal fallopian tubes and found that the predominant type of movement seen was peristalsis and this was in the direction of the uterus. During pregnancy the activity in the tube is markedly diminished. In a pregnant cow the author observed that the tube of the pregnant horn showed much less activity than the tube of the non-pregnant horn. Tubes not only show changes in motility during pregnancy but also during the different phases of the menstrual cycle. This difference in activity is due to the maturation of the follicle and is most likely dependent upon a hormone. In rabbits, intact tubes in situ show increased peristalsis after injection of pituitary preparations. However, other drugs which influence the uterus to contract have much less effect on the fallopian tubes.

Salpingostomy in the Treatment of Sterility Due to Tubal Occlusion. From 1907 to 1924 salpingostomy was performed on 65 patients. In some cases the operation was unilateral, in others bilateral and the method of A. Martin was used. Of these 65 patients, 6 could not be traced by O. Riter[4], 8 were not married, and 7 who had one normal tube and a salpingostomy on the other became pregnant. There were no pregnancies in 40 cases where the mended tube or tubes were the only paths for the ova. However, four patients did become pregnant who had only one tube and that the one operated upon. Only one of these patients went to term. Two others had a miscarriage, while the third had a second ectopic pregnancy. Salpingostomy, therefore, yielded only 9 per cent. of pregnancies (4 out of 44). In performing salpingostomy two conditions are necessary, first, the path leading from the tube to the uterus must be open and second, the artificial opening must remain patent. The best results are obtained in the cases where tubal occlusion is due to sepsis, while the least favorable results are in the cases due to gonorrhea and

(4) Monatschr. f. Geburtsh. u. Gynäk., October, 1925.

tuberculosis. (Of the 65 cases operated upon, 7 had tuberculous salpingitis. One of these patients subsequently became pregnant twice but miscarried both times.) After plastic operations on the tube, patency must be maintained by tubal insufflation and heat in the form of diathermy, hot air and baths.

There was no mortality in this series of 65 cases. There need be no fear of ectopic pregnancy after plastic operations on the tube. The patient who had a tubal pregnancy after operation had had the other tube removed because of the same condition and evidently she had a predisposition to ectopic pregnancy. A greater disadvantage of plastic operations is the tendency to abortion. This may be due to the fact that the fertilized ovum has only a short distance to travel and hence reaches the uterus before it has arrived at the stage necessary for implantation. Abortions may also be due to the cause of the tubal closure, namely, tuberculosis, perimetritis, and so forth.

Tubal Implantation into the Uterus. A. Mandelstamm[5] reports eight cases of tubal implantation in all of which the Rubin test had previously failed to demonstrate patency. Before the tubal implantation operation the following points were made certain: (1) A normal sediment reaction; (2) normal urethral and cervical secretions; (3) clean vagina; (4) normal size and movability of the adnexa; (5) potency of the husband. In these cases the tubes were implanted into the uterus through an incision in the posterior wall of the uterus. These cases were subsequently tested for tubal patency but no gas could be made to pass through the tubes. In two additional cases in which the intramural portions of the tubes were removed by a circular incision, and the tubes implanted into the cornua, subsequent Rubin tests were positive. The author points out that normal anatomic relationships must be maintained, hence the tube should be im-

(5) Monatschr. f. Geburtsh. u. Gynäk., May, 1926.

planted in the uterine cornua after the removal of the obliterated intramural part. To make certain that the tubal orifice remains patent it is advisable to divide the proximal end into two flaps and sew the mucosa to the serosa. The length of the implanted part should be as great as the interstitial portion removed.

Normal Delivery After Tubal Implantation. Last year F. Unterburger[6] reported three cases in which he performed tubal implantation. In one case pregnancy immediately followed the operation. In all three cases two Rubin tests were done before operation and one during the operation but all the tests were negative. The proximal end of the retained part of the tube was implanted into the uterine cavity through a sagittal incision in the fundus. This is the first case of pregnancy following tubal implantation in Europe. (In America, Watkins and Cullen reported pregnancies following tubal implantation.)

In Unterburger's case the pregnancy was entirely uneventful. Delivery was accomplished by a low forceps operation because the fetal heart tones slowed down to 80 per minute and meconium was being passed. A seven and one-half pound live baby was delivered. There was no postpartum hemorrhage and the puerperium was normal. In this case the uterine incision withstood not only the increased intra-uterine pressure incident to pregnancy but also the contractions of labor.

The chief indication for tubal implantation is disease of the isthmal portion of the fallopian tube, such as salpingitis isthmica nodosa, cornual myoma and tubal pregnancy in the isthmus.

A New Maneuver in Abdominal Palpation. C. O. McCormick[7] developed a maneuver which he has found to be very practical, and so far as his knowledge goes, a similar maneuver has not been described. The patient

(6) Monatschr. f. Geburtsh. u. Gynäk., April, 1926.
(7) Am. J. Obst. & Gynec., November, 1925.

is placed on an examination table and her abdomen exposed as for abdominal palpation. The examiner stands to her right facing her, and with his right hand assuming a "C" grasp, he places the end of his extended right thumb perpendicularly to her umbilicus and firmly, though gently, depresses it. He then applies the "C" grasp, composed of the palmar surface of the thumb, radial palm, and first two or three fingers, to

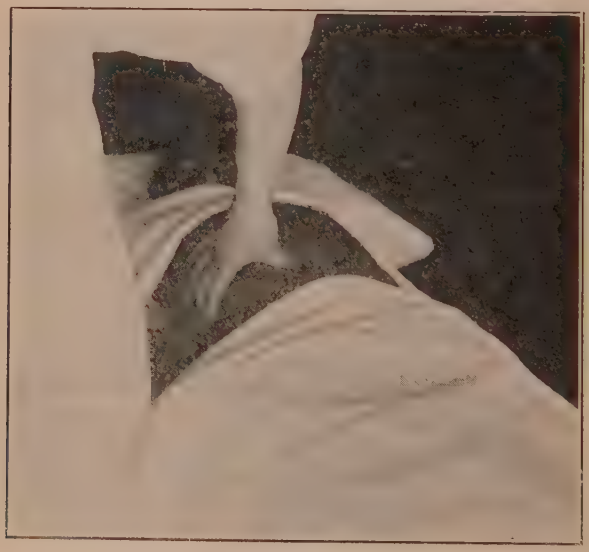


Figure 1.

the patient's left side of the abdomen along the transverse plane passing through the umbilicus. The ends of the fingers should reach as far back on to the patient's loin as their extent will comfortably allow. After a few seconds' effort, in noting whether he has the firm, round, smooth body of the baby within his grasp, or whether it contains soft, irregular, or indefinite parts, the examiner releases his grasp and still holding his thumb against the depressed umbilicus,

pivots the palm and fingers 180 degrees counter-clockwise, and reapplies a similar grasp to the patient's right side of the abdomen along the same transverse plane. Then for comparison, he makes the same notations on the parts grasped as were made on the left.

With the fetus in the longitudinal axis, this maneuver does not only readily assist in differentiating a right and a left position, but also anterior, transverse and posterior. This determination is made by noting whether the area of main resistance of the baby's back is against the thumb, the middle grasp, or the finger ends. For obvious reasons the grasp must be of a "C" and not a "U" or "V" type. (Fig. 1.)

Vaginal Douches at the End of Pregnancy. According to E. Schwartzkopf[8] daily vaginal douches of 0.5 per cent. lactic acid for a few weeks before labor favorably influence the vaginal flora and diminish the incidence of fever during the puerperium. The lactic acid restores normal conditions because Zweifel found that in the normal vaginal secretion lactic acid is found in 0.5 per cent. concentration. Furthermore, lactic acid has some bacteriocidal powers. To prove the value of lactic acid the author had one series of women given alkaline douches and another series lactic acid douches. The former douche unfavorably influenced the vaginal flora in 9 per cent. of the cases, hence it was soon discontinued. This bad effect resulted because the alkaline solution destroyed the Döderlein bacillus with the result that foreign bacteria invaded the vagina. Lactic acid douches, on the other hand, produced very favorable results.

[It is often desirable to have some means of preparing the vagina for an aseptic labor. The Editor has used ½ per cent. lactic acid douches frequently, and thinks there is some value in them. In cases of placenta previa where the vagina is constantly soiled with blood dribbling from the uterus the streptococcus, an occasional

(8) Zentralbl. f. Gynäk., Feb. 27, 1926.

tenant of the vagina, may develop invasive virulence. Here it is my practice to prescribe lactic acid douches twice daily as long as the patient is kept under observation and as long as there is any blood in the vagina. Also, pregnant women near term, with vaginal discharges, need such a cleansing and anti-bacterial procedure.]

Abortion and Extra-Uterine Pregnancy

Abortion. In a series of six articles, H. Vignes* very thoroughly discusses the question of abortion from many angles. He takes up its clinical features, its frequency, and its manifold etiology. A special section is devoted to criminal abortions and the author emphasizes that the only real proof of a criminal abortion is the presence of damage on the mother or the fetus left by the traumatic agent. Medicinal, mechanical, physical and thermic abortive agents are discussed, as well as the role played by defective nidation and afflictions of the fetus itself, including its membranes. The role of infections in the mother and in the fetus and insufficiency of the maternal endocrine glands, are emphasized. The author also discusses the question of defective germ plasm as a cause of abortion.

Therapy of Habitual Premature Termination of Labor and Habitual Death of the Fetus. J. Novak[9] reminds us that since 1901 Lomer has treated patients who gave birth to macerated fetuses with potassium iodid. He gave one gram daily and based his treatment on the belief that most cases were due to syphilis. But this treatment was efficacious not only in patients with syphilis but also in those with nephritis and endometritis. He added iron for the anemia which many of the patients had. Other individuals obtained good results with this treatment also. The advent of the

(*) Le Concours Med., July, August and September, 1926.
(9) Zentralbl. f. Gynäk., Apr. 10, 1926.

Wassermann reaction proved that not all cases of habitual death of the fetus were due to syphilis. Novak reports four cases in which he obtained good results with potassium iodid and iron. He attributes the good results with iodid therapy to stimulation of the thyroid gland. It may be also that the iron given stimulates the placenta.

[Good practice, but first find out if the woman has a toxic goiter already.—Ed.]

The Methods of Treatment of Afebrile Abortions and Their Dangers. According to K. Fink[1], the uterine sound, forceps and sharp curet, because of their dangers, have no place in the treatment of abortions. The large dull curet and Winter forceps are valuable. The former should be used only when the finger cannot accomplish the desired purpose or when the uterus is small and hard. The Winter forceps are only valuable when pieces of tissue which have been released by the finger cannot be removed with the finger. The forceps should not be used to loosen pieces of the ovum from the uterine wall. Where the uterus is soft and there are large fetal remains, the cervix should be dilated to admit at least one finger before exploration. If the cervix is soft, Hegar dilators should be used, but if the cervix is hard a laminaria tent should be employed. About 35 per cent. of all abortions can be terminated without operation, hence medicinal measures should be employed frequently.

[Watchful expectancy is the treatment of clean abortion in progress. If any haste is required, quinin and pituitrin may be given. If the uterus has to be invaded, the finger should be used wherever possible, and Fink's recommendations are excellent. If difficulty in emptying the uterus is experienced, the operation should not be forced—rather pack the uterus with gauze and finish the task after twenty-four hours—unless nature has done it herself in the meantime.—Ed.]

(1) Deutsche med. Wchenschr., Nov. 6, 1925.

The Prevention of Abortion After Operations Performed During Pregnancy. Among 30 ovariotomies performed during pregnancy, we are informed by B. v. Varo[2], abortion occurred in only those cases where bleeding began before operation and in those in whom operation was performed at a time when the menses would have occurred were the patient not pregnant. In only one case where operation coincided with the time the menses would have appeared did abortion fail to follow. On the other hand, there was not a single abortion which followed the operation performed during the intermenstrual period. Abortions occurred in the first group because the uterus is more irritable at the time menses should occur. During the operation the uterus should be handled gently and after operation it is advisable to give the patient novatropin and papaverin for a few days to reduce the irritability of the uterus. In only 10 per cent. of the 30 cases here reported did abortion follow and this good result the author attributes to the use of sedatives after operation.

Surgical Intervention During Pregnancy. From 1907 to 1926 at the Tarnier Clinic, 113 women were operated upon during pregnancy. These operations were analyzed by A. Brindeau and C. Juge* and they found that only three of the patients died, a mortality of 2.55 per cent. Of the 113 patients, 45 went to term without any complications, 53 continued their pregnancies but no information was obtained about their labors and in 13 cases the operation was followed by interruption of the pregnancy. Among 45 operations for ovarian cyst, there were five miscarriages and one death. Among 18 fibroid cases there were two miscarriages and two deaths and among 17 cases of appendicitis there was one miscarriage and no deaths.

In general, operations on pregnant women are not more difficult than on nonpregnant women but the tis-

(2) Zentralbl. f. Gynäk., July 24, 1926.
(*) Obstét. et gynéc., September, 1926.

sues are more vascular. After the operation the patient should be given morphin for four days.

Critical Remarks on the Therapy of Febrile Abortion. The abortions at the Padua Women's Clinic for the last three years are reviewed by F. Clauser[3]. There were altogether 610 cases of abortions, of which 526 were actively treated. All the cases of incomplete abortion which were afebrile were treated actively and there was no mortality. On the other hand, among the 264 febrile cases which were actively treated there were two deaths (0.75 per cent.). Ninety-two per cent. of the patients left the hospital within 10 days. The author's experience leads him to advise immediate emptying of the uterus in febrile abortions because the quicker the uterus is emptied the better the prognosis. Conservative treatment is to be employed only in cases of acute peritonitis and general sepsis. The uterus should be emptied with instruments and by an experienced individual.

The Conservative Drainage Treatment of Febrile Abortions. At the Marburg Clinic, G. Schwarz[4] analyzed 73 febrile abortions and 68 additional infected cases. In 62 of the febrile cases the drainage treatment was carried out and not one of the patients died. The treatment consists of the introduction of a dry, or alcohol-saturated, thin piece of gauze into the uterus just beyond the internal os. This piece of gauze is changed daily for five or six days under aseptic precautions. The gauze keeps the cervix patent and permits good drainage. It also stimulates uterine contractions which causes the expulsion of any fetal residue which may be present. Spontaneous expulsion of placental remains usually occurs after the second or third change of gauze. The danger of bleeding is slight. Marked bleeding may be controlled by the insertion of a wider piece of gauze.

(3) Zentralbl. f. Gynäk., Feb. 6, 1926.
(4) Zentralbl. f. Gynäk., May 8, 1926

The results with this treatment have been so good, the author feels the treatment can be used in all infected abortions, even those in which digital or instrumental manipulation appears to be dangerous. The patients remained in the hospital on an average of between fifteen and twenty days.

[In infected abortions the Editor leaves the uterus alone unless there is bleeding—then he packs with 4 per cent. iodoform gauze (iodoform is ancient, is it not?). The emptying of the uterus is aided by the administration of quinin and pituitrin, 3 grains of the former every hour for 5 doses, then 1 ampoule of pituitary extract every 3 hours for 4 doses. I feel that the uterus will drain itself if left alone and the patient's position frequently changed.]

Two Cases of Puerperal Tetanus Occurring After Criminal Abortions. G. H. Schneider[5] reports two new cases of tetanus which followed criminal abortion. In one case serum alone was used in the treatment and in the other a hysterectomy was performed in addition to the use of serum. Both patients died. Among 111 cases reported in the literature the mortality was 91 per cent. All of the cases occurred after some intrauterine manipulation and most occurred after criminal abortions.

The infection may remain latent a long time and may light up after an operation has been performed in the region of the old healed wounds. Trauma to the skin or mucous membrane is always necessary for the disease to manifest itself. The tetanus bacilli found in the feces of human beings do not give rise to tetanus. True tetanus bacilli thrive best in deep, irregular wounds and in tissues greatly destroyed. The bacilli live in symbiosis with pyogenic organisms, like staphylococci and streptococci and also and more especially with the gas bacillus. The latter organisms use up the oxygen present in the wounds and permit the

(5) Med. klin., Jan. 22, 1926.

tetanus bacilli to grow because they are obligatory anaerobe. The puerperal uterus forms an especially favorable medium for the tetanus bacilli because immediately after birth there are large wounds present, the placental site is very irregular, and there is necrotic tissue present during the expulsion of the decidua. Furthermore, the uterus affords anaerobic conditions and vaginal bacteria invade the uterine cavity.

Combined Intra-Uterine and Extra-Uterine Pregnancy. The simultaneous occurrence of gestation within and without the uterus is, of course, a type of twin pregnancy, one fertilized ovum implanting itself in the uterus and the other in the tube, or perhaps, rarely, in the ovary. It is not surprising, therefore, that in quite a number of the reports in the literature mention is made of the occurrence of multiple pregnancies, either in the previous history of the patient herself or in that of some member of her own or her husband's family.

On the other hand, there is a group of cases in which the combination of pregnancies is due to the superimposition of a uterine gestation upon a previous one in the tube.

In 1913 Neugebauer reported 244 cases of combined intra-uterine and extra-uterine pregnancy. Thirty-two new cases have been collected by E. Novak[6] including the four being reported in this paper. This brings the total number of cases to date up to 278.

Combined pregnancy is merely a manifestation of twin gestation, which is far more frequent than twin births, for in a considerable proportion of cases one of the twin embryos succumbs.

It is of interest to note in connection with the twin pregnancy idea, that in at least six of the 276 cases collected in this paper there was a history of previous multiple pregnancy (5 twin, 1 triplet). There is not the slightest doubt that this number would be much larger were the histories complete in this respect. It

(6) Surg. Gynec. & Obst., July, 1926.

is also of interest, as Neugebauer points out, that in a considerable number of cases the combined pregnancy is some form of the triplet variety, *i.e.*, either uterine twins and one tubal embryo, or one uterine embryo with two in one tube, or each of the two tubes. This multiplicity in tubal pregnancies is a well-known occurrence being explained by Arey (2) and others on the basis of the defective environmental conditions encountered by the tubally implanted embryo.

It is evident that the clinical picture in cases of combined pregnancy must present the widest variation, chiefly dependent upon whether the uterine or the extra-uterine pregnancy dominates the picture. On this basis we may describe the following chief groups:

1. Cases with history suggesting ectopic pregnancy. For reasons which are evident, these cases make up the great bulk of those observed in early pregnancy, as can be seen from a glance over the case records. Of the two concurrent gestations it is the one in the tube which practically always gives the first significant symptoms.

In many cases the uterus at operation was found to be so definitely enlarged as to leave no doubt as to the coexistence of uterine pregnancy, while in others this was not suspected until much later, or until an abortion had occurred.

Novak has previously urged the view, supported by clinical observation, that the bleeding in cases of tubal pregnancy, aside perhaps from a slight show now and then, dates from the death of the embryo. Generally speaking, the cases of tubal pregnancy in which there is no bleeding are those in which the embryo is still living. When, therefore, bleeding is absent in a case of combined pregnancy, it would seem likely that at least one of the embryos is still living, exercising its protective influence upon the uterine decidua and thus preventing bleeding.

2. Cases in which the intra-uterine pregnancy dominates the clinical picture. There is, of course, a certain number of cases in which, in spite of tubal rupture, the uterine condition advances to full term.

3. Finally, there is a group of cases in which both pregnancies advance to full term, ending at times in the birth of two live babies, one from within the uterus and one from without. Such deliveries are, of course, always operative for the extra-uterine child, and usually for the intra-uterine baby as well. In the 276 cases herein surveyed, nine extra-uterine babies were delivered alive at full term and all by laparotomy.

There is a considerably larger group in which both pregnancies continued to full term, with delivery of the live intra-uterine fetus and the operative removal, often at a considerably later period, of the dead extra-uterine embryo.

The treatment of course, must be adapted to the indications of the individual case. Laparotomy is indicated even when the association of intra-uterine pregnancy is recognized. If continuous and free bleeding continues and is associated with the presence of a unilateral mass, it is well to precede the laparotomy by the performance of curettage, with miscroscopic examination of the curettings. The operation should be done gently, so as not to start intra-abdominal bleeding. The finding of villi, of course, settles the diagnosis of a recent intra-uterine pregnancy. The extra-uterine pregnancy is then managed along the usual surgical lines.

Expectant treatment would seem justified in cases in which two live embryos are recognized in the later months, with the performance of abdominal section as soon as labor sets in. Certainly an attempt to deliver the intra-uterine child through the natural channels would be associated with considerable hazard to both of the children and also to the mother, although, as mentioned above, spontaneous delivery of the living uter-

ine child has, in a few unrecognized cases, preceded the operative removal of the living extra-uterine child.

The Value of the Leukocyte Count as an Aid to Diagnosis in Ectopic Gestation. A study of 150 cases of ectopic gestation at the Woman's Hospital by L. K. P. Farrar[7] led her to the following conclusions:

In ectopic gestation the leukocyte count fluctuates according to the amount of fresh blood being thrown into the peritoneal cavity and the rate of absorption. The leukocyte count tends to drop quickly to normal as the blood in the peritoneal cavity is absorbed or walled in; 48 per cent. of the 150 cases of ectopic gestation had a normal leukocyte count before operation was performed.

The leukocyte count was normal in 29 cases of unruptured tubal pregnancy in which there was no free blood and in 43 cases of ruptured pregnancy in which the blood was walled in. The leukocyte count was an index in 150 cases to the amount of free blood in the peritoneal cavity and the polymorphonuclear leukocyte count was increased markedly only in cases having fresh blood in the pelvis and increased in direct proportion to the amount of recent blood found at the time of operation.

The fluctuating leukocyte count together with the moderate elevation of tempertaure differentiates ectopic gestation from a purulent salpingitis with its more uniformly high leukocyte count and fluctuating temperature. In cases of rupture of tubal pregnancy the steadily rising leukocyte count indicates active bleeding before the fall in the number of red cells or hemoglobin gives warning of the condition. The leukocyte count to be of diagnostic value must be taken at least daily and in critical cases even hourly and used in conjunction with the history and clinical findings in the case.

(7) Surg. Gynec. & Obst., November. 1925.

[Even more valuable is the Fahraeus sedimentation test. While pregnancy causes a rapid fall of the red blood corpuscles, an inflammatory reaction causes one still more rapid.—Ed.]

A Contribution to the Biomechanism and the Pathology of Ectopic Pregnancy with a Consideration of Some of Its Clinical Phenomena. According to M. R. Robinson,[8] the main reason for the premature termination of most ectopic pregnancies is the excessive intracapsular bleeding, due to the laying open of blood vessels in the ovular bed by the chorionic villi, which are much larger than the capillaries of the compacta in the uterus.

The intra- and the extratubal conditions of an organic nature are by far less responsible for the ectopic nidation of the ovum than is the disturbed peristaltic function of the tube, and the premature ripening of the placentation properties of the ovum. The terminologies "unruptured tubal pregnancy" and "tubal abortion" are incorrect, for they do not express the true pathologic state. All ectopic pregnancies, even those going to term, sustain capsular ruptures of greater or lesser degrees, at some time during the gestation period. A so-called "unruptured tubal pregnancy" is in reality an "intracapsular rupture" and a "tubal abortion" is an "internal rupture" with the gestation products discharged into the tube lumen, which finally escape through the fimbriated end. The point of rupture in the majority of his cases was found by the author to be opposite the placentation site; this is contrary to the accepted teachings. The correctness of his observations is sustained by the following facts: (1) During the early weeks of pregnancy the chorionic villi are equipotent and they may arrode any part of the capsularis, and (2) the part of the capsularis that will yield first is the thinnest and the most stretched portion, which is usually not the placental area, for

(8) Am. J. Obst. & Gynec., August, 1926.

the latter always shows the greatest amount of hypertrophy and hyperplasia. Uterine bleeding manifesting itself during the course of an ectopic pregnancy, indicates fetal death, and a simultaneous suspension of the inhibitory power of the corpus luteum over the endometrium, which is the only source of the uterine bleeding.

The Association of Congenital Diverticula of the Fallopian Tube with Tubal Pregnancy. The material for this study by F. P. McNalley[9] consisted of thirteen tubes removed at operation, 12 of which were the site of a pregnancy. Of the 12 pregnant tubes, diverticula were demonstrated in 10, or 83.3 per cent. In addition to the congenital diverticula there were, in four cases, gland-like inclusions in the tube wall lined with columnar or cuboidal epithelium, the so-called adenomyosis or salpingitis isthmica nodosa.

As far as inflammation in these cases is concerned, the author was unable to prove its previous existence except in one case, where definite pelvic adhesions were found at operation, showing the existence of a previous peritonitis. Microscopic study showed the cellular infiltration always found in association with a pregnancy which has been disturbed, whether uterine or tubal, and which it is impossible to distinguish from true inflammation. In three of the ten cases, the malformation was directly responsible for the arrest of the ovum, and it probably was in the others. In view of these findings, even in so small a series, it seems reasonable that diverticula are more common than is usually believed, and that they are an etiologic factor of considerable importance in the production of tubal pregnancy.

Research Concerning the Cause of Tubal Pregnancy. It is the belief L. Schoenholz[1] that the essential cause of tubal implantation of the ovum is an anomaly of

(9) Am. J. Obst. & Gynec., September, 1926.
(1) Arch. f. Gynäk., 1926, Vol. 127, 606.

the tubal mucosa in the form of diverticular projections of mucosa into the tube wall and a meshwork of folds of mucosa. These forms have been found in tubes free from inflammatory changes. The diverticular formation accounts for most tubal pregnancies. Where a diverticulum or a meshwork was found associated with an inflammatory process in the tube, it was found that the former was not caused by the inflammation. Hence, the belief must be discarded that an inflammation is the basis for the origin of diverticula and meshwork of mucosa which are found in cases of tubal pregnancy. The cause is essentially an anomaly in the formation of the tube. Inflammation of the tube which is associated with abscess formation in the tubal wall can, however, produce diverticula and the follicular arrangement of the mucosa. When gonorrhea produces such changes, sterility is the rule.

The Formation of Decidua in the Gravid Tube. In over 100 specimens R. Zimmermann[2] found a more or less decidual reaction in most of the fallopian tubes during uterine pregnancy. In a case of tubal pregnancy a definite decidual reaction was found.

The mucosa of the tube cannot form a spongiosa and compacta because of the lack of proper gland elements, hence it always consists of a compacta only. In many cases of tubal pregnancy an inflammatory process is the cause. In many cases of chronic endosalpingitis there is an atrophy of the mucosa. If an ovum becomes embedded in such a mucous membrane, the fetal elements soon reach the musculature of the tube because the mucosa is very thin. Furthermore, there is very little decidual reaction in such a mucosa. However, in the cases of normal mucosa when an ovum embeds itself a decidual reaction can occur. This may explain the cases in which a decidual reaction is lacking at the site of implantation in the tube, but is found in another part of the tube. Such an explanation sup-

(2) Monatsschr. f. Geburtsh. u. Gynäk., January, 1926.

ports the hormonal theory as opposed to the theories which claim that the development of decidua in the tube depends upon an inflammatory process.

Diagnostic Puncture of the Culdesac in the Presence of Extra-Uterine Pregnancy. During the last 12 years at the Leningrad Clinic there were 636 cases of extra-uterine pregnancy and in 161 of these (25.3 per cent.) a pelvic puncture was performed. In none of the cases was injury caused by the puncture, hence the procedure is harmless. L. Zeitlin[3] emphasizes that the puncture must be performed exactly in the midline of the posterior fornix and it should not be employed in cases of shock. Pelvic puncture is important because it helps decide the type of operation to be performed. If pus is found mixed with blood, if there is evidence of degeneration of blood or if micro-organisms are found in the blood, one should limit the operation to a posterior colpotomy and not perform a laparotomy because the latter is dangerous in the presence of these findings. The withdrawal of blood by means of a pelvic puncture is successful in 90 per cent. of the cases in which blood is present in the abdominal cavity. However, because of the high percentage of failures one should not rule out ectopic pregnancy when a negative result is obtained. In such cases reliance should be placed upon the history and the objective findings. In advanced cases fetal elements may be found in the blood obtained, but in these cases more information can be secured from a colpotomy than from a puncture. In the very acute cases of ectopic pregnancy one should not lose time by performing a colpotomy but one should perform an abdominal operation immediately. When a pelvic puncture is to be followed by a laparotomy the latter should be performed immediately after the puncture.

[The Editor subscribes to all that Zeitlin has written. He uses the aspirating syringe frequently in cases of

(3) Monatschr. f. Geburtsh. u. Gynäk., February, 1926.

suspected ectopic pregnancy. During the "flu" epidemic two cases were found to be influenzal salpingitis and thus were spared laparotomy.]

An Example of Abnormal Migration of an Ovum. On July 14, 1924, a patient had her right tube removed because of a tubal pregnancy and her left ovary removed because it contained a large cyst. This patient returned to the hospital the twentieth of the following December, complaining of having missed two menstrual periods. The last menses had begun on October 15. An examination showed a uterine pregnancy of six to seven weeks' duration. The pregnancy went to term and a live baby was delivered spontaneously. According to R. Slivinsky[4], the ovum in this case came from the right ovary, crossed the abdominal cavity and entered the left tube before it gained access to the uterus. [Nothing new.—Ed.]

The Corpus Luteum and Hydatid Mole. P. Gaifami[5] studied five uteri which contained hydatid moles. In two cases the indication for hysterectomy was severe hemorrhage and in a third case it was the presence of vaginal metastases. In addition to these five cases there were 26 other cases of hydatid mole during the past ten years at the obstetrical and gynecological clinic of Rome.

The author was interested in studying the relationship of the ovarian changes which accompany hydatid mole and especially the relationship of the corpus luteum. In three of the five cases studied, both ovaries showed the typical polycystic condition to a marked degree. From his study the author concludes that polycystic lesions of the ovaries accompany hydatid mole in more than one-half of all cases. The fundamental anatomical unity between the changes of the ovaries in hydatid mole and in normal pregnancy is indisputable, but the intensity of the changes is so

(4) Revue franc. de gynéc. et d'obstét., February, 1926.
(5) Ibid.

great that it deserves special consideration. The usual name for the change is not correct. Since it is admitted that the change is the product of atretic follicles, it is wrong to call the cysts lutein cysts or cystomas, polycystic degeneration of the corpus luteum, or cysts of the corpus luteum, because one might gain the impression that they are derived from the corpus luteum of pregnancy. One fact is certain, namely, that the corpus luteum is constantly present and both macroscopically and microscopically does not differ from that of normal pregnancy. The author proposes as names polycystic lutein degeneration or luteo-follicular cysts. The term corpus luteum cysts should be reserved for the formations which are derived from a true corpus luteum, be it menstrual or gravid.

Complications

Pulmonary Tuberculosis and Pregnancy. This study by E. W. Bridgman and V. Norwood[6] is based on the review of the first 14,000 histories of the indoor obstetrical service of the Johns Hopkins Hospital. In this series the obstetrical cards give 134 patients who were grouped as having pulmonary tuberculosis in one or more of its various forms. In 50 cases there was not sufficient evidence to say the patient had tuberculosis.

Although gestation and the puerperium may serve as the final factor to "break down" patients who have tuberculosis the authors can find no evidence that pregnancy in any way promotes the incidence rate. And when one remembers that the child-bearing age of women corresponds to that age period in which pulmonary tuberculosis ordinarily appears, even without pregnancy, and that the incidence rate at this age is definitely below the male incidence rate, except between the ages of 20 and 30, one wonders whether the

(6) Bull. Johns Hopkins Hosp., February, 1926.

association of tuberculosis and pregnancy has not been exaggerated, and whether it is not in great part coincidental.

In 12 cases abortion was performed between the second and third months of pregnancy, except one at the sixth month. Three could be followed for only 2 weeks after operation and so are discarded. Of the remaining 9 patients, 2 (22 per cent.) were living and improved at the end of 1 year, 2 (22 per cent.) were living but not improved at the end of 1 year, and 5 (57 per cent.) were dead within 1 year. This is a small group, but the figures are more than suggestive when compared with the similar group in whom abortion was not done, for it suggests that the prognosis is made worse by operation. And, of course, the baby is sacrificed.

The authors feel that this is an important observation and merits careful investigation. If it is substantiated, as they believe it will be, then operative procedures will be discontinued in pregnancy complicated by active pulmonary tuberculosis. On the other hand, it is conceivable that evacuation of the uterus early in pregnancy, may be brought about under spinal anesthesia, without shock to the patient, or at least, with a degree of shock which is counterbalanced by the protection of the patient against the unfavorable result of going to term. However, with the technic in vogue today the authors feel that operative procedure in the presence of an active pulmonary lesion is followed by a higher mortality rate than if expectant therapy alone is employed.

Bridgman and Norwood agree with Bernard who says, "it is better where one is tuberculous not to become pregnant," and they feel that the risks of pregnancy are definitely increased by tuberculosis, depending, to some degree, on the type of lesion. But this risk is by no means prohibitive in inactive cases, provided that the household duties can be controlled, addi-

tional rest obtained, and the lesion is of the fibroid type and has been quiescent for at least 3 years, so that, where there is an overwhelming desire for children, the risks of pregnancy may be assumed.

What shall we do in the case of a pregnant woman in whom active tuberculosis is found? Treat the tuberculosis to the uttermost, and disregard the pregnancy. Rest and more rest, preferably in a sanitarium, and under those whose life's business is the treatment of tuberculosis. *Artificial termination of pregnancy is not indicated,* and in the present series led to a somewhat worse outcome. The excitement, the etherization, the shock of the operation, are additional factors that curtail the patient's strength just at the time when every bit of resistance is most needed to combat the acute onset, or the "flare-up" of the tuberculous lesion.

On the other hand, the authors feel that a later sterilization is an entirely different matter—to be done at some period after the patient has been through her pregnancy, and the tuberculosis has become quiescent.

The next important problem in this connection is the child. Here, one can make fairly definite statements. The child of the mother with active tuberculosis has a poor chance of escaping infection, and when it is in constant association with the mother, the figures from the authors' observation and from various writers show a mortality of over 50 per cent. within the first year. And even if they live, the incidence rate of tuberculosis is very high, for, inasmuch as children in the first 2 or 3 years of life are remarkably susceptible to tuberculous infection, the intimate contact between mother and young baby tends nearly always toward the infection of the child. If there is any sign of activity in the mother, the child should be taken away and brought up elsewhere, until her death, or until her lesion has become quiescent. Furthermore, the extra work of nursing the baby is obviously harmful to the

mother, and even in quiescent tuberculosis, it is probably safer to advise as short a nursing period as is compatible with the fair interests of the child.

[Pregnancy, before the fourth month, can be easily terminated without general anesthesia; therefore the objection raised in this paper can be laid aside. Most investigators have found that tuberculosis of the lungs shortens life much more when pregnancy becomes an added drain on the system. The Editor has always held, and fuller experience has not contradicted him, that in the early months it is best to empty the uterus, let the woman cure her tuberculosis and then bear children. See Couvelaire's article following.]

A Maternity for Tuberculous Women. Since 1921 the Baudelocque Maternity has had a special arrangement for the care of pregnant women who have pulmonary tuberculosis and for the protection of the children of these mothers. This scheme was organized by A. Couvelaire[7] with the assistance of Leon Bernard. In a special building each patient has her own room in which she can be delivered and spend the puerperium. A certain number enter toward the end of pregnancy and the care of these patients is in the hands of medical specialists. The newborn infants are separated from their mothers immediately after birth and are placed in a special room of another pavilion. From 1921 to 1926 the Maternity had 315 tuberculous patients. Pneumothorax was performed on 57 per cent. of these women. Of the total number 19 died (6 per cent.) but two died of obstetrical complications. Among 105 patients admitted before May 1, 1924, 41 (40 per cent.) died of tuberculosis either during pregnancy, during labor, or within one year after termination of pregnancy. Maternal tuberculosis by itself does not cause any intra-uterine fetal deaths. In general the maternal affliction did not affect the weight of the baby but in a certain number of cases

(7) Gynéc. et Obstét., June, 1926.

it did. Among the 280 viable children, 45 died in the clinic before the end of one month, and eight died in the clinic between the first and the fourth month, giving a mortality of 18 per cent. The cause of this high mortality is not a congenital weakness but imperfect conditions in the hospital and insufficient mothers' milk. Some of the children lost weight rapidly and died without any apparent cause.

Glycosuria and Pregnancy. Glycosuria is frequently found during pregnancy. It means sometimes that the patient is a diabetic, but usually it signifies only a temporary or an insignificant condition. In the first instance treatment is indicated; in the second no treatment is required. The condition should never be disregarded, however, until it has been definitely determined whether or not it is of diabetic or of innocent origin.

Two cases taken from a larger series by H. J. John[8] illustrate the problem presented by the presence of glycosuria in pregnancy and the necessary steps for differentiating innocent from diabetic glycosuria.

The practical points illustrated by the first case are the following: When glycosuria is discovered during pregnancy it may be, and often is, a sign of the initiation of the diabetic status, when the earliest changes—the hydropic degeneration of the beta cells of the islands of Langerhans—are taking place. If the condition is cared for at this stage, the patient stands a good chance of recovery, of a restoration of the islands to a normal or nearly normal status, as Copp and Barclay have shown by their work with dogs at the Physiatric Institute. Their findings provide a concrete demonstration of what has been repeatedly seen clinically, that is, that when diabetes is treated early in its development, there is a good chance of restoration of the insulogenic function; but if the treatment is postponed until the islands are gone—fibrosed—

(8) Surg. Gynec. & Obst., April, 1926.

nothing will bring about their regeneration. It is for this reason that when glycosuria occurs during pregnancy, it should never be ignored as a chance occurrence, as due "perhaps to sugar of milk," but the patient should be subjected to a rigid examination to determine the exact status.

As a rule, the diagnosis is quickly and easily made, except in borderline cases, by making a blood sugar estimation two and one-half hours after a heavy meal of carbohydrates. If this blood sugar value is 160 milligrams per 100 cubic centimeters of blood, or more, we can safely say that we are dealing with a diabetic patient, in whom, however, the condition may clear up after parturition, provided the condition is properly controlled in the meantime. On the other hand, if the blood sugar estimation in the above test is 90 milligrams per 100 cubic centimeters of blood, or less, then we may know definitely that we are dealing with the renal type of glycosuria which requires no treatment.

[Very valuable points in this paper.—Ed.]

Syphilis and Termination of Pregnancy. Among 1,500,000 new-born children Löser found 58,500 cases of congenital syphilis (nearly 4 per cent.). A much higher incidence is given for France (20 to 30 per cent.) and Italy (25.6 per cent.). Furthermore, between 30 to 42 per cent. of all abortions and 50 to 80 per cent. of all premature labors are due to syphilis.

Pregnancy generally does not have a deleterious effect on syphilis but visceral syphilis produces disturbances in pregnant women. Syphilis of the liver, the nervous system, the endocrine glands, the circulatory apparatus and other organs can produce grave complications in pregnancy which may necessitate termination of the pregnancy.

According to A. Buschke and M. Gumpert[9], the number of apparently healthy children born of syphilitic

(9) Med. klin., Jan. 29, 1926.

mothers varies between 15 and 30 per cent. Antenatal treatment increases the number of healthy children and this treatment should be begun in the third month of pregnancy and continued to the end. The treatment should be continued all through pregnancy because while intra-uterine infection seldom occurs before the fourth month, it may not take place until labor pains begin, due to rupture of blood vessels.

Postnatal treatment of luetic children does not give very favorable results. The mortality of syphilitic children during the first year is between 25 and 60 per cent. The incidence of imbecility is 20 per cent. and of syphilis of the nervous system between 13 and 15 per cent. Morgan found that 34 per cent. of all the blind and 17.25 per cent. of all the deaf were syphilitic. Neurosyphilis occurred eight times as frequently in the mothers and three times as frequently in the fathers of children with congenital neurosyphilis as among parents of children without neurosyphilis. For eugenic reasons, when it has been shown that families have degenerated children, it is desirable that abortion be permitted among these families. Abortion is not, of course, advocated for all cases of syphilis but only where there is damage to the mother, where regular and intensive treatment cannot be carried out in cases of familial syphilis of the nervous system and where there are bad social conditions.

Fathers who have had syphilis, have received proper treatment and have remained free of symptoms for a long time are less likely to transmit the disease than the mothers under the same conditions, because the father does not transmit the disease directly but only through infection of the mother.

[The Editor cannot agree that syphilis is an indication for abortion. Intensive treatment must be given. Nature will do the rest.]

Appendicitis in Pregnancy. In the presence of acute abdominal symptoms suggesting appendicitis, the com-

plication of pregnancy should be disregarded, and early interference is even more urgent, if possible, than in the ordinary case. The operative results in the early months of pregnancy are apparently as good as they are in nonpregnant women and the danger of abortion is very slight.

G. D. Royston and A. O. Fisher[1] report six cases which illustrate the chronic or recurrent type of appendicitis. The operative results should not differ from those obtained in similar cases uncomplicated by pregnancy. They also report 4 cases which clearly show the dangers of conservatism in acute cases and the necessity of immediate operation. The latter four cases illustrate the usual failure of these infections to localize and the rapidity with which they spread. The authors feel that the most reliable symptom is localized pain and tenderness over the region of the appendix, while fever, leukocytosis, nausea, and vomiting are frequently absent in the early cases and appear only after the infection has begun to spread. After appendectomy, morphin is indicated to arrest threatened abortion. Simple drainage is much safer than a prolonged effort to find or deliver a difficult appendix. The warning should be sounded that too much valuable time should not be consumed in a laborious scheme of differential diagnosis—if the appendix is suspected, operate.

Appendicitis During Pregnancy and the Puerperium. E. Jerlov[2] studied the case histories of 21 hospitals and in the private practice of three physicians for patients who had appendicitis during pregnancy or the puerperium. During the years 1900 to 1920 there occurred altogether 456 cases, of which 390 occurred during pregnancy and 66 during the puerperium. Most of the former cases occurred during the early months of pregnancy and two-thirds of the patients were under

(1) Am. J. Obst. & Gynec., February, 1926.
(2) Acta obstet. et gynec. Scandinav., 1925, iv, Supplement.

30 years of age. Appendicitis which occurred in the puerperium was purely accidental. Since appendicitis during pregnancy occurred in only 1.3 per cent. of all gravidae, pregnancy does not tend to increase the susceptibility to appendicitis, because appendicitis is definitely more frequent among nonpregnant women.

In mild cases of appendicitis during pregnancy and the puerperium, tenderness is localized at McBurney's point, but in severe cases the tenderness is in the lower right quadrant. The temperature is often low. It is important to rule out pyelitis, but often cystopyelitis occurs with appendicitis during pregnancy. Other pathologic conditions to be considered are acute salpingo-oophoritis, extra-uterine pregnancy, twisted ovarian cyst, cholecystitis and cholelithiasis.

Pregnancy does not tend to cause a recurrence of an old appendicitis. In cases of appendicitis with peritonitis, pregnancy has a bad influence. Labor does not affect mild cases but aggravates the cases complicated by purulent peritonitis when it precedes operation. When, on the other hand, operation precedes labor, the results are definitely better. In the mild cases of appendicitis operated on during pregnancy, abortions occurred in only 13 per cent. In the severe cases the incidence of abortion was between 70 and 80 per cent. This was due to the purulent peritonitis which was present. In 19.2 per cent. of the latter cases salpingo-oophoritis occurred.

The total maternal mortality among 263 cases was 9.5 per cent. Among the 167 mild cases there was no death, but among the 96 severe cases the mortality was 26 per cent.; hence the mortality of the mild cases in pregnancy is no greater than in nonpregnant individuals. In the case of an abscess, however, the mortality is higher in the pregnant than in the nonpregnant individual. The cases of diffuse peritonitis in pregnant women, on the other hand, do not have a worse prognosis than in the nonpregnant. The cases where abor-

tion occurred had a high mortality, hence abortion is a bad prognostic sign. By the same token there is no indication to open the uterus before performing an appendectomy during pregnancy. There is no indication to perform a hysterectomy in the cases complicated by peritonitis. In all mild cases immediate operation should be performed but the uterus should not be evacuated. If the uterus is emptied before operation, the prognosis is much worse than if the uterus is emptied after operation. The uterus should not be emptied routinely after delivery. The best results will be obtained by waiting for a spontaneous delivery.

[In two cases where the Editor had to perform cesarean section at the time an acute appendicitis was also present, he performed the low operation, laparotrachelotomy, then removed the appendix, draining the appendical area through the upper end of the median incision. Whether this is ideal practice or not, he does not know, but both mothers and babies survived. A surgeon criticized this practice, saying that, after the low cervical is done, the belly should be closed, then the appendix removed in the usual manner through another incision. Perhaps he is right. The Editor will concede the superiority of drainage through a second opening.]

Thyroid Hypertrophy and Pregnancy; With Data on Basal Metabolism and the Calcium Content of the Blood. Approximately 41 per cent. of C. H. Davis'[3] last 520 patients examined in early pregnancy had visible hypertrophy of the thyroid. Eight of these patients returned with typical symptoms of toxic goiter within fourteen months after delivery. Small doses of iodin were administered during pregnancy but none after delivery. Overwork, worry and other forms of nervous strain appear as contributing causes in each case.

(3) J. A. M. A., Sept. 25, 1926.

The use of iodin during pregnancy by women who live in goiter districts is advocated as a prophylactic measure, unless they have adenoma of the thyroid. Iodin hyperthyroidism is recognized as a possibility, but thus far has not been observed. The average metabolic rate of 9 women with normal thyroids at term was +2.4 per cent. Their average after delivery was —1.3 per cent. The average rate of seven women with simple hypertrophy was +22.1 per cent. before term, with a later drop to +3.1 per cent. The average rate of nine women believed to be of the hyperthyroid type was +32.2 per cent. before delivery, with a drop eleven days post-partum to +8.9 per cent. With the exception of two patients in the last group, these patients took small doses of iodin during the last months of pregnancy. Patients previously operated on for toxic goiter are usually benefited by taking small doses of iodin during pregnancy.

Patients with toxemia of pregnancy had low readings. Three with edema and little or no albumin had lower readings than the single patient with high blood pressure, albumin and casts but no edema.

Comparative studies of the blood calcium and thyroid function, as indicated by the basal metabolic rate, show no relation between the milligrams of calcium in each 100 c.c of serum and the metabolic rate. The calcium determinations in twenty-four women with uncomplicated pregnancy showed an average of 9.97 mg. before delivery and 10.5 eleven days post-partum. Most of these women had taken calcium salts in addition to their food. The average for the patients with thyroid hypertrophy was slightly higher than the average for the women with normal thyroids, but a small series does not warrant conclusions. Three patients with toxemia of pregnancy showed a lowering of the calcium post-partum, while the normal patients usually showed an apparent increase within eleven days. The use of cod liver oil and ultraviolet irradiation did not

appear to increase the blood calcium in the few cases studied.

This is offered as a preliminary study. The observations thus far made suggest that, if a woman with a normal thyroid has sufficient idodin during the course of a normal pregnancy, her basal metabolic rate will remain within normal limits, although it may show a slight increase toward the end of pregnancy. Metabolic rates that are well above normal limits are believed to indicate abnormal function of the thyroid, usually of slight degree. The return to normal limits within eleven days post-partum, while the rule, does not prove that the increased rate did not signify an abnormal function. These patients should be kept under medical observation for a long time after delivery. Many of the so-called neurotics of the past probably had disturbed thyroid function.

Pregnancy Complicating Exophthalmic Goiter and Adenomatous Goiter with Hyperthyroidism. To elucidate the questions of a possible relationship between exophthalmic goiter and adenomatous goiter with hyperthyroidism and pregnancy, as well as to determine their clinical effect on one another, a study was made by R. D. Mussey, W. A. Plummer, and W. M. Boothby[4] of all women whose pregnancy was complicated by these diseases and who were examined at the Mayo Clinic during the 10-year period from January 1, 1916, to January 1, 1926. Of the group of 5,043 women with exophthalmic goiter examined during this period, only 32 were pregnant, and of the group of 2,185 women having adenomatous goiter with hyperthyroidism, only 10 were pregnant. Since approximately 70 per cent. of patients having adenomatous goiter with hyperthyroidism are more than 40, while about the same percentage of patients with exophthalmic goiter are less than 40, the proportion of women pregnant while having the latter disease is slightly

(4) J. A. M. A., Sep., 25, 1926.

greater than of the former. Of the 7,228 women in the two groups, only 42 (0.6 per cent.) were pregnant. This rare coincidence confirms Markoe's statement, made in 1918, that of approximately 100,000 pregnant women at the New York Lying-in Hospital only eight appeared to be suffering from hyperthyroidism. The data can be further contrasted with those given in a report from the Mayo Clinic by Mussey in which 1.9 per cent. of women operated on for appendicitis and 1.7 per cent. of those operated on for disease of the gallbladder were pregnant.

In the cases of this series, there was no evidence that pregnancy influenced the course of exophthalmic goiter. In only two of the 32 cases of exophthalmic goiter could the onset of the disease be considered, with reasonable certainty, to have developed during the pregnancy. In each of these cases the onset was rapid and severe, and was accompanied by definite nausea and vomiting, symptoms characteristic of the crisis stage of exophthalmic goiter, but in both it was first mistaken for the vomiting so frequently associated with pregnancy. While it is possible that the vomiting was due to both conditions, it is well to emphasize that it is not infrequent in exophthalmic goiter, because in such cases it can be completely relieved by proper use of compound solution of iodin (Lugol's solution). Thirty women became pregnant during the course of exophthalmic goiter, mostly during a period of remission in the disease: three of these after ligation of the superior thyroid arteries, and three during a recurrence of the disease following partial thyroidectomy. None of the mothers with exophthalmic goiter died while under observation.

Of the 32 patients with exophthalmic goiter, 23 were delivered at term, 2 aborted, 2 were delivered prematurely, 2 are now pregnant, and 3 have not been traced. All but 2 of the 23 full-term babies were alive and

normal at birth. One of the 2 was stillborn following a difficult forceps delivery.

In considering the methods of treatment used for the relief of exophthalmic goiter in cases of pregnancy, the patients may be advantageously divided into two groups: those treated before the introduction of iodin as a therapeutic aid in the control of exophthalmic goiter (20 patients), and those treated after this period (12 patients), which treatment dates from the early spring of 1923. Eighteen of the patients in the first group received some form of operative treatment. Ligation of one or both superior thyroid arteries was performed on 12 patients. This was followed by partial thyroidectomy on 4, and 8 were carried through pregnancy without thyroidectomy. Primary partial thyroidectomy was performed on 6 patients. In the second group the use of iodin obviated the necessity of any preliminary ligations. Thyroidectomy was performed on 7 after their symptoms had improved under treatment with compound solution of iodin, and 3 were carried through pregnancy on the solution without operative intervention.

All of the 10 patients having adenomatous goiter with hyperthyroidism became pregnant after the onset of the hyperthyroidism. None of the mothers died, and 9 were delivered of normal living babies; one baby was stillborn because of dystocia. All but one of the mothers had had some form of operative treatment on the thyroid gland.

In reviewing these cases of exophthalmic goiter and adenomatous goiter with hyperthyroidism associated with pregnancy, one is first impressed with the rarity of the association. It is also noteworthy that serious additional complications were not more frequent than is usual in either condition alone, and that therapeutic abortion was not necessary. Finally, both the course of pregnancy and the maternal and fetal mortality were not appreciably affected as the result of the syndrome

due to exophthalmic goiter or to adenomatous goiter with hyperthyroidism, nor, on the other hand, did the pregnancy render the control of these two diseases noticeably more difficult.

The Incompatibility of Pregnancy and Fibroids of the Uterus. According to G. C. Mosher[5], the striking fact that there is an incompatibility of pregnancy and uterine fibroids is demonstrated by: (1) The frequency of sterility associated with fibroids; (2) the tendency to abortion and premature labor in these subjects, and (3) the stormy experience which these patients endure in pregnancy, owing to obstruction at the brim of the pelvis, to pain, to hemorrhage and to sepsis. To these must be added the possibility of degenerative change, owing to the extraordinary nutrition to which the uterus is subject, by increased blood supply in pregnancy.

Fibroids may increase greatly in size, due to their hypertrophic growth and also to edema. They will soften and flatten, becoming difficult to discern in the later weeks of pregnancy. In the case of interstitial fibroids we expect sterility to follow. Subserous fibroids are not so prone to affect fertility. This is the teaching of most authorities. It is conservative to say that 25 per cent. of all women, subject to myoma, are sterile.

As regards dystocia, the position of the tumor is more important than the size. Those of cervical origin and pedunculated myomata are most difficult. Dystocia may result from an unfavorable position assumed by the fetus. These result from the tumor being in the lower part of the body or cervix. Placenta previa is to be anticipated as a more frequent complication in myomas than in a physiologic uterus.

The question of treatment of a fibroid tumor in pregnancy resolves itself into determining whether the life of the patient is endangered by allowing the growth

(5) Am. J. Obst. & Gynec., March, 1926.

to remain, or whether the health of the patient is to be seriously disturbed. In the interest of the child, interference should be delayed as long as possible. Generally, if the tumor decidedly obstructs the parturient canal and cannot be displaced, it should be removed. All tumors injured during labor, or showing marked signs of degeneration, should be at once removed.

The reasons for interference with fibroids complicating pregnancy are pain and hemorrhage; also, there is a secondary source of disturbance—irritation from peritoneal adhesions, which becomes so distressing as to call for relief. The pain is over the site of the uterus. It is persistent and may become unbearable. Rest in bed, with attention to bowels and kidneys, holding in reserve the aid of sedatives which are to be used when indicated, are the steps to be followed before radical interference. Hemorrhage, which appears like a threatened abortion, may be encountered. Irregular metrorrhagia has been noted during the first three months.

No interstitial fibroid with pregnancy should be removed by myomectomy, nor one which involves an opening through to the membranes. Statistics vary as to abortion following myomectomy.

The patients requiring hysterectomy are women near the menopause; also, those with large fibroids, which if situated in the pelvis, give rise to severe pressure symptoms, causing much pain. No expectant treatment, or abortion is here available. Hysterectomy is the only plan of treatment.

With a single tumor and no symptoms, it should be left severely alone. In this way, many cases come to term. Pain is the outstanding symptom; even in addition to the size of the tumor, it may prove intolerable, so that removal is necessary. If the patient passes through her labor without undue suffering, normal

presentation may result although we find a preponderance of abnormality.

Precaution must be observed in delivery to determine whether obstruction is insurmountable. If a cesarean section is done under the circumstances, authors advise immediate hysterectomy, unless the tumor seems such that subsequent myomectomy may be done, and the uterus left for future pregnancy. No attempt to pull the head of the child through the pelvis, obstructed by a large fibroid, should be made, as the child may be killed and the mother later die from shock. The crushed bruised fibroid is also liable to necrosis.

In the third stage of labor the conditions to be feared are: first, hemorrhage, and later, sepsis. Hemorrhage may be immediate post-partum, or later in puerperium. Sepsis is fortunately more rare than hemorrhage. Bruising by forceps delivery, version, or faulty curettage, is liable to cause sloughing. Usually, after the danger of post-partum hemorrhage is passed, the puerperium runs a favorable course. Fibroids usually diminish in size and harden during involution; frequently the tumor shrinks so that it is no longer palpable. The placenta may be retained and is often difficult to remove, especially if blocked by growths or displaced by hypertrophy of the musculature.

[The Editor has had a large experience with fibroids and pregnancy. He is always astonished at what nature can do in these cases. He has never found it necessary to induce abortion, and only three times to operate during pregnancy, once for acute degeneration, once for intra-peritoneal hemorrhage—rupture of a superficial sinus,—and once for an enormous fibroid producing cardiac symptoms. The large majority of cases can be carried through until term, and nearly all of these will deliver themselves or need only obstetric aid. Watchful expectancy is the general treatment of fibroids in pregnancy, labor and the puerperium.]

Proliferative Gingivitis of Pregnancy. The presence of tumor-like masses upon the gums of women during pregnancy, with spontaneous regression after delivery, is not an uncommon occurrence. During the past three years, S. Monash[7] observed six cases which he describes in some detail.

The masses began to form at a variable time during pregnancy, increased in size unless treated, and spontaneously diminished in size or disappeared completely after delivery. The growth, which attracts our attention because of its size, is not, as a rule, an isolated thing in these cases. It is usually accompanied by a generalized gingivitis and represents simply an exaggerated degree of this condition. The name proliferative gingivitis of pregnancy is proposed for all phases of the condition. This type of growth is inflammatory and should not be classed as a tumor. There is no gingivitis peculiar to and found only in pregnancy. A gingivitis practically identical with that described may be seen at times in men and in women who are not pregnant. Elimination of all irritating factors and, if necessary, excision of the growth about a month or two after delivery, should constitute the treatment.

Osteomalacia in China. According to J. P. Maxwell and L. M. Miles[8], China is at present one of the world centers for the study of osteomalacia. In the special area involved the incidence is from 1 to 3 per cent. of child-bearing women. Whilst its effects are more often shown in pregnancy and the puerperium, it frequently begins about the time of puberty.

The disease is one due to a deficiency diet, the principal lack being in a shortage of mineral content and the activator for calcium metabolism. Lack of sunlight and movement are contributing factors in its production. The bones of full time fetuses from mothers with osteomalacia do not show the signs of rickets, but of osteoporosis. There is, however, a little evidence

(7) Surg. Gynec. & Obst., June, 1926.
(8) J. Obst. & Gynec. Brit. Emp., 1925, Vol. 32, No. 3.

to suggest that these infants develop rickets more easily than the normal child. The sequelae of the disease are two-fold—one, deformity of the pelvis, the results of which on labor may be counteracted by a planned cesarean section; two, interference with marital relations, which may be treated by a new operation in which portions of the pubes and ischium are resected.

The ovaries have nothing to do with the disease, and it is not necessary either to remove them or even to tie the fallopian tubes, provided that the woman is treated with cod liver oil and calcium, and this treatment is kept up during any future pregnancy. By improving the diet and supplying cod liver oil it should be possible in due time to stamp the disease out. Prevention is the principal thing, and to this end a settled government and improved means of communication are essential. Animals also suffer from this disease and can be cured by the administration of cod liver oil.

Severe Epistaxis During Pregnancy. Mild epistaxis is a rather frequent occurrence during pregnancy. This is due to a physiological swelling of the nasal mucous membrane. Even large nosebleeds in pregnancy may produce no disturbance in the healthy gravida as exemplified by two cases reported by H. Broich.[9] A few authors have described a disease which is called pernicious-like anemia of pregnancy. The patients are usually multiparas, who in the latter half of pregnancy show anemia and in whom nosebleed is a frequent symptom. The cause of this anemia is a pregnancy toxemia which destroys the maternal blood. Another type of anemia is due to chronic essential thrombopenia. Such a case is described by the author. Two sisters of the patient had a latent form of this disease.

In these cases of anemia, termination of pregnancy is indicated. In cases of thrombopenia, operative procedures are dangerous because of the increased bleeding time. Attempts should be made to check hemorrhage

(9) Monatschr. f. Geburtsh. u. Gynäk., October, 1925.

by injections of corpus luteum extracts and coagulants. Transfusion of large amounts of blood is useless because the transfused blood is destroyed within 24 to 48 hours. In cases of chronic anemia small transfusions of citrated blood are much more effective. The author used 15 c.c. of the husband's citrated blood as a trial biological transfusion, but the patient died three hours after the injection. Hence an intravenous transfusion of even a very small amount of blood should be done only for a very strict indication.

[The anemias in pregnancy need a complete revision, re-classification,—above all, much more study. The Editor suggests the term pathemia for all these abnormal blood states.]

Incarcerated Gravid Retroflexed Uterus with Fatal Intoxication. The following is reported by G. H. Schneider[1]. A 34-year-old multipara was treated for catarrh of the bladder. A short time later she became pregnant and soon thereafter there was slight bleeding, nausea and vomiting and rectal tenesmus. No dysuria was present other than increased frequency. A few weeks later, however, there was difficulty in urination, headache, dizziness, vomiting, marked constipation and colicky pains in the bladder and kidney regions. The patient was slightly jaundiced. The bladder was enormously distended and 36 ounces of dark urine were obtained by catheter. The cervix was way up under the symphysis pubis, the uterus was retroflexed and filled the entire pelvic cavity. The uterus could be brought up out of the pelvis after catheterization. A piece of placenta projected from the cervix, hence the uterus was emptied with ovum forceps. The urine contained red blood cells, white blood cells, B. coli, hyaline and granular casts and necrotic pieces of bladder mucosa. The patient died of hypostatic pneumonia five days after admission to the hospital without ever having had any fever. Autopsy revealed puerperal endo-

(1) Monatschrift f. Geburtsh. u. Gynäk., November, 1925.

metritis in a retroflexed uterus, pseudomembranous cystitis with gangrene, dilatation of the renal pelvis and ureters, and cloudy swelling of the liver and kidneys.

Successful Treatment of Severe Progressive Paralysis During Pregnancy with Malarial Inoculations. The association of pregnancy and progressive paralysis is uncommon. At the Rudolph-Virchow Hospital two cases were seen within six months. Both patients were in dire distress on admission and both showed the bad effect of pregnancy on the paralysis. R. Unger[2] reports in detail the case of a patient who was treated for paralysis during pregnancy by means of inoculation with the quotidian type of malaria. The patient's husband had previously been successfully treated for general paresis by means of malarial inoculations.

The patient who was admitted in a critical condition, had 22 febrile elevations as high as 102.2° during the course of the treatment. At term she had an almost painless labor and delivered spontaneously a living child which weighed 2640 grams. The child was normal in every respect. Its Wassermann test was negative in contradistinction to the mother, who had a strongly positive Wassermann reaction and its blood like that of the mother showed no malarial organisms. The puerperal period was uneventful and the patient left the hospital with her baby on the thirteenth day.

This case shows first the bad effect of pregnancy on paralysis, for on admission the patient, who was then in the third month of pregnancy, showed signs of marked degeneration. Secondly, the case shows that an intensive malarial cure did not endanger the pregnancy. The high temperature and chills did not cause an abortion, although other febrile conditions often do cause the termination of pregnancy.

Two months after the malaria fever disappeared, which occurred spontaneously, there was begun a course of treatments with neosalvarsan.

(2) Med. klin., Oct. 2, 1925.

Necrosis of the Corpus Luteum of Pregnancy. As the pathological findings in two very similar cases of pernicious vomiting of pregnancy were of such unusual nature, D. Brannan and M. Cohen[3] were prompted to record their observations. The three well-known indexes to the medical literature were consulted regarding necrosis of the corpus luteum, but nowhere could a reference to this subject be found.

In the authors' first case the subject was a primipara who presented the clinical features of pernicious vomiting in the third month of pregnancy. The illness was acute and progressive, terminating in death 44 days after the onset. The hyperglycemia and glycosuria present were certainly the result of the liberal therapeutic use of glucose solution. The acidosis, as revealed by the urinalysis, was obviously the result of starvation.

Aside from marked pulmonary edema, the postmortem examination, so far as the gross findings were concerned, revealed little of significance. Microscopically the extensive coagulative necrosis of the corpus luteum constituted by far the most important lesion.

In the second case the clinical picture was also that of pernicious vomiting in early pregnancy. This patient was a multipara in the third month of gestation.

The important lesions microscopically were in the corpus luteum, and in the liver and the decidua. The acute decidual endometritis certainly followed the introduction of the foreign body into the uterus.

The necrosis in both instances was primarily a coagulative necrosis. In neither case was there any evidence of repair. The form of each corpus luteum had been well preserved by the fibrous tissue frame work. On the whole, in view of the gross and microscopic findings, it appears that the bulk of the necrosis was not of long duration and hence occurred late in the disease. The necrosis in these cases probably resulted from the underlying toxemias of which the patients suffered. It there-

(3) Surg. Gynec. & Obst., February, 1926.

fore apparently belongs in the same category with the central necrosis of the liver cells and also with that of the epithelium of the convoluted tubules of the kidneys, either or both of which may be found degenerated in this malady.

The Toxemias

The Vomiting of Pregnancy, Its Causation and Its Treatment by Ovarian Extract. P. J. Carter[4] has a simple method of treating the vomiting of pregnancy. Mild cases are given 5 grains of extract of whole ovary by mouth every three hours; severer ones are given whole ovary hypodermically, and the intractable vomiting is cured (he says) by the same plus luminal sodium hypodermically. In addition glucose is given per rectum and salt solution under the skin. Finally glucose and insulin are resorted to. Only 1 case required abortion, 3 aborted spontaneously, 3 others were uncured but went to term.

The Use of Fluids in the Treatment of Hyperemesis Gravidarum. According to V. J. Harding and H. B. Van Wyck[5], the theory of carbohydrate deficiency or glycogen deficiency of the liver as the etiologic cause of the nausea and vomiting of pregnancy was first stated by Duncan and Harding in 1918 and published in extenso by Harding in 1921. (Titus, Hoffmann and Givens independently published a similar theory.) It postulated either an absolute or relative lack of glycogen reserve in the maternal liver. It allowed a correlation of the fatty degenerated liver found at autopsy in this condition with physiologic fatty infiltration due to hunger, as noted by Mottram, and thus brought in the factor of starvation as one, if not the main, contributory cause of the clinical entity. It became logical to treat such cases with carbohydrate in an attempt to supply any defici-

(4) Am. J. Obst. & Gynec., June, 1926.
(5) Am. J. Obst. & Gynec., January, 1926.

ency, and a scheme of treatment was elaborated by Harding and Watson. Mild cases were treated with small meals, consisting mainly of carbohydrates, throughout the day; more severe cases, where it was impossible to supply food by mouth, were treated by the use of glucose solutions rectally, interstitially, or intravenously, as the case demanded.

From the investigation of a number of cases treated in this manner, it soon became evident that the best laboratory guide for treatment was the observation of the daily excretion of urine. Cases which responded successfully to the therapy showed, coincident with improvement in clinical condition, a greatly increased volume of urine with a lowered specific gravity. So important do the authors consider the factor of dehydration, that any patient admitted for vomiting of pregnancy to the wards of the Toronto General Hospital is at once treated, as a matter of routine, with 1000 c.c. of 5 per cent. glucose solution in 1 per cent. saline given intravenously each day until a diuresis is obtained. By "diuresis" is meant that the 24-hour output of urine shall reach at least 1000 c.c. and shall have a specific gravity of 1010 or less. During this period of treatment the patient is isolated from the remainder of the ward and no visitors allowed. At the same time rectal enemata of 200 c.c. of 10 per cent. glucose in normal saline are given three times daily and at bedtime 30 to 60 grains or sodium bromide are given in each enema for the first day or so. No attempt is made to feed solids by mouth, but fluids are urged even if the patient is vomiting freely, and she is encouraged and allowed to drink any liquid she may fancy except tea, coffee, milk or cocoa. This treatment usually results, within three or four days, in such marked improvement that the patient is able to take food. It is not continued for a period longer than six days without clinical improvement. In the event of failure under these conditions therapeutic abortion is performed. The use of

glucose, though important, thus has become secondary to the use of fluids in treating a severe case of pernicious vomiting of pregnancy.

The vomiting of pregnancy is usually not characterized by acidosis, although there is always a ketonuria arising, undoubtedly in part, from the starvation accompanying the condition. Without considering whether an uncompensated acidosis *per se* can produce the symptom of vomiting, there is no doubt that a simple ketonuria does not give rise to this effect.

The use of insulin in order to abolish ketonuria is clearly unnecessary. Its use in skillful hands may be harmless, but the authors do not believe it to be a valuable adjuvant to treatment. The utilization of glucose given intravenously is normal. Such an injection should be given slowly, and Thalhimer's remarks and directions on this point are excellent. Most physicians are afraid to give daily intravenous glucose solutions, yet their use is attended with no untoward results, provided proper care is taken in the sterilization of the solutions, and the temperature and rate of administration are carefully controlled.

The authors examined their more recent records and found that in uncomplicated cases the patients were able to take small meals in from three to six days. The average for 14 cases was 4.1 days from admittance to cessation of vomiting and the taking of food.

[It is not entirely lack of fluids which causes hyperemesis. The Editor had one case where he used the duodenal tube to feed the patient, and he gave her so much fluid that she became *anasarcous*, edematous all over, even her conjunctivae, and yet the vomiting continued, and danger to life necessitated abortion. We are still in utter darkness regarding the cause of vomiting of pregnancy, and therefore a rational treatment is impossible. The acutely toxemic cases will die unless the uterus is emptied before the damage to the liver is irremediable, while the neurotic and mildly toxemic

forms will get well under any of numerous methods of treatment. It is essential to supply fluids, dextrose and vegetable acids (orange juice). Rest, isolation, suggestion, bromides, all have their place. The duodenal tube is valuable. The only vitally important element in the treatment of hyperemesis is to know how to tell if a given patient is suffering from true, acute, toxemic vomiting, i.e., the hepatic form. Here one must empty the uterus to save the woman's life. Such cases are very rare. A man may go many years before seeing one, but in the meantime he will have,—by successfully treating milder cases,—fooled himself into believing the others do not exist, or that he could not have one with his particular methods of treatment. One cannot rely on laboratory examinations for the diagnosis of the severity of this form of toxemia. Clinical observation and a careful evaluation of the effects of treatment will give us the necessary information.]

Subcutaneous Injection of Oxygen for Hyperemesis Gravidarum. Cabanes[6] treated two severe cases of pernicious vomiting of pregnancy by injecting 500 c.c. subcutaneously and in both cases the vomiting ceased. However, the ptyalism which was present persisted. In one case, two, and in the other case, three injections were given.

[Suggestion.—Ed.]

The Management of Hypertension in Pregnancy. Arterial hypertension as a complication arising in pregnancy is sufficiently frequent and serious to warrant careful consideration by internists and obstetricians alike. It must be constantly borne in mind that hypertension *per se* is but a symptom of vascular disease. However, it is something more; it is an index to the severity of the vascular damage. Therefore, any logical therapy must of necessity be directed toward the vascular injury and particularly in the direction of the etiologic factors responsible for the vascular disturbance.

(6) Bull. de la Soc. d'obstét. et de gynéc., October, 1925.

The clinical types of hypertension met with in the pregnant woman may be classified according to E. J. Stieglitz[7] into four chief groups as follows:

1. A relatively benign type, occurring moderately early in the pregnancy (in the fifth or sixth month), characterized by a gradual rise in blood pressure and evidences of a mild nephrosis. These patients are not very toxic. The incidence of active foci of infection in this type is very high and is undoubtedly of etiologic significance.

2. A late, malignant type, occurring with a sudden unheralded onset, a rapid rise in arterial tension and evidences of marked intoxication, quickly becoming a true eclampsia, with hepatic as well as renal and vascular damage.

3. Hypertension in pregnancy in patients with preexisting vascular and usually renal disease, both undergoing exacerbation during the pregnancy.

4. Hypertension with definite complications such as thyrotoxicosis, cardiac disease, acute nephritis, acute infections or obstetrical difficulties.

The first step in the management is necessarily a careful study of the situation and the correct classification of the type. Much light may be thrown upon the pathogenesis of the disease by careful consideration of the past history of the patient.

The elimination as soon as possible of any source of intoxication is of paramount importance. Sources of vascular irritation in the dietary should be deleted at once, particularly the condiments and spices containing irritant volatile oils, and the seasoned meat extractives such as broths and gravies. Too radical restriction of protein intake is inadvisable, particularly in view of the active anabolic metabolism of the fetus.

The third procedure of attack is the promotion and stimulation of elimination of toxic products. In the absence of distinct cardiac contraindications the drink-

(7) Illinois. M. J., September, 1926.

ing of liberal quantities of bland fluids is to be encouraged. At least two or three liters of fluid should be the daily consumption. This is indicated even in the presence of diffuse toxic edema. The early use of digitalis in conjunction with rest in every case showing the slightest evidence of cardiac failure is of great value in avoiding serious cardiac difficulties during the strain of labor. The strenuous use of cathartics is associated with considerable risk, particularly near term. Sweating and venesection are usually unnecessary, and the former rather dangerous.

The judicious use of sedatives has proven to be of considerable assistance. Sodium bromid in doses of 10 to 15 gr. three or four times per day has been employed extensively.

If, in spite of the therapeutic measures outlined briefly above, the blood pressure continues to rise and intoxication increases, the internist must gracefully admit defeat and advise prompt termination of the pregnancy. In the second type of cases, the impending or true eclamptics, there should be no time lost in medical therapy, but the uterus should be emptied without delay. It cannot be too strongly emphasized that digitalis is indicated in all toxic cases or those presenting evidences of cardiac embarrassment.

The prognosis in the first type, the nephrosis of pregnancy with focal infection, is usually good. These women ordinarily go to term if properly cared for prenatally, and apparently recover completely, or almost completely, following delivery. In the eclamptic form the immediate outlook is notoriously precarious, but if recovery takes place there is little evidence of residual permanent damage. Subsequent pregnancies are often uneventful. Those patients in whom the condition consists of an exacerbation of a previously existing chronic vascular disease frequently display the greatest elevations in blood pressure. The immediate outlook depends largely upon the severity of the intoxication of the

present gestation. The future health of these women is rarely good; the vascular disease persists despite all therapy, and is greatly aggravated by each succeeding pregnancy. The prognosis, like the therapy, of the fourth, or last, group is an individual problem, varying with the nature and severity of the complication. Careful, continuous, frequent pre-natal care along the lines outlined above can do much in reducing the morbidity of hypertensions in pregnancy.

Toxemias of Pregnancy. It is J. E. Talbot's[8] opinion that toxemia of pregnancy is always associated with foci of chronic infection and several clinical characteristics of the disease suggest its infectious origin. Blood-borne infection as a factor in the disease is shown by the occasional recovery of a variety of bacteria from the blood stream of the toxic patient, and by the evidence that many placental infarcts are due to blood-borne infection from a variety of sources. The relation between the blood-borne infection and the foci of chronic infection is made probable by an increase in activity in these foci, evidenced by the association of neuralgias with the onset and progress of the toxemia. There is evidence that many pathological units found in association with toxemia may also be due to blood-borne infection. Treatment by the removal of foci of chronic infection in the presence of a toxemia is disappointing and dangerous, but treatment by the removal of all foci of chronic infection either before or between pregnancies as a preventive measure, gives good results.

A Classification of the Toxemias of the Latter Half of Pregnancy. From a study of 120 admissions of patients presenting one or other type of the toxemias of pregnancy, H. J. Stander and C. H. Peckham[9] suggest the following classification for the late toxemias of pregnancy: (1) eclampsia, (2) pre-eclampsia, (3) chronic nephritis, complicating pregnancy, (4) eclampsia su-

(8) Atlantic M. J., July, 1926.
(9) Am. J. Obst. & Gynec., May, 1926.

perimposed upon nephritis, and (5) low reserve kidney. It should be clearly understood that an intelligent differential diagnosis can often not be made until the end of the third week of the puerperium. Consequently, the authors advise that in the borderline cases the final diagnosis be deferred until as late as possible. This is the mode of procedure in the Johns Hopkins clinic and in the future in doubtful cases, the final diagnosis will be deferred until six weeks after delivery, when the patient will be readmitted to the service and be subjected to searching clinical and chemical investigation.

The authors' analyses of the classes enumerated above is as follows:

1. *Eclampsia.*—This is a fairly definite entity. The convulsions and coma, the relatively sudden appearance of a greatly elevated blood pressure and a large amount of albumin in the urine occurring during the last third of pregnancy, but more frequently in the neighborhood of term, and the complete return to normal at the end of the puerperium constitute the usual picture. Often one sees an increase in the amount of uric acid in the blood, an elevated blood sugar, and a low CO_2 combining power associated with a large amount of ammonia in the urine, all of which rapidly disappear during the puerperium. Ophthalmoscopic examination may show a detachment or edema of the retina, but never any sign of albuminuric retinitis, or of the other changes which are so frequently associated with nephritis.

There is no evidence that eclampsia *per se* does any permanent damage to the kidneys and for this reason should not be considered a counter indication for further conception.

2. *Pre-eclampsia.*—This seems to be a definite entity and differs from eclampsia only in so far as the patient has no convulsions or coma, and that the attack may be of a milder character. The authors' studies seem to indicate that this is probably the rarest variety of tox-

emia of pregnancy and that its incidence will not exceed 5 per cent. of all toxemic patients.

3. *Chronic Nephritis Complicating Pregnancy.*—In this group the process is progressive. Each subsequent pregnancy is associated with an increasing degree of renal impairment. The existence of chronic nephritis is evidenced by the fact that two or three weeks after delivery, the blood pressure still remains above the normal level. In such cases the diastolic level is of especial value, and in the table of averages it is noted that the patients with chronic nephritis are usually discharged with a diastolic pressure of well over 90, and in addition with about half a gram of albumin in the urine. The nitrogen partition in the urine may also be upset, together with an increase in the N.P.N. An examination of the eye-grounds may show an albuminuric retinitis and arteriosclerosis or some other sign of involvement, such as edema or hemorrhage of the retina.

It is of the utmost importance to remember in subsequent pregnancies these manifestations become more marked and usually appear earlier in the course of pregnancy. In the woman with chronic nephritis, pregnancy is indeed a serious matter, as the extra load of each succeeding pregnancy leads to progressive kidney damage.

4. *Low Reserve Kidney.*—During the last few months of pregnancy, there may appear a moderate rise of blood pressure, usually about 150/90, and relatively small amount of albumin in the urine ranging from a fraction of a gram to a gram, to very slightly over one gram just before delivery. There may also be some edema and very rarely a complaint of headache. By the end of the puerperium the blood pressure has resumed its normal level, the urine contains no albumin or only a faint trace and any edema that may have been present, has disappeared.

Eclampsia may be followed by a normal subsequent pregnancy, a pregnancy complicated by a low kidney

reserve, by a chronic nephritis or rarely by a repeated attack of eclampsia.

Intradermal Salt Solution Test in Normal and Toxemic Pregnancies. Since the intradermal salt solution test has been demonstrated to be a means of predicting the onset and course of edemas and the length of the disappearance time has been considered to have a probable relationship to the degree of certain types of intoxications, its applicability to diagnosis and prognosis in the late toxemias of pregnancy was tested by A. F. Lash[1]. The test was made in 47 normal pregnant women at term to ascertain the normal disappearance time during pregnancy, and in 46 women (including 17 eclamptics) with the late toxemias of pregnancy.

The author found that the disappearance time of intradermally injected salt solution in normal pregnant women is longer in the negro than in the white. This racial difference can possibly be explained by the thicker skin in the negro. The women with the toxemias of pregnancy show definitely decreased disappearance time, more marked in those with convulsions. The degree of decrease in the disappearance time varies directly with the degree of severity of the toxemia, increasing with the general clinical improvement.

Basal Metabolism in the Toxemias of Pregnancy. Methods for differentiating between the various types of toxemias appearing in late pregnancy are still quite inadequate. It was with the hope of procuring a further aid for this differential diagnosis as well as of throwing more light on the nature of the toxemias that a study of the basal metabolism was undertaken by H. J. Stander and C. H. Peckham[2].

In the latter half of pregnancy the authors noticed a definite elevation in the basal metabolic rate and a return to normal at about the tenth day of the puerperium. The return was gradual and steady. In pre-

(1) Surg. Gynec. & Obst., July, 1926.
(2) Bull. Johns Hopkins Hosp., March, 1926.

eclamptic toxemia the basal metabolic rate was slightly higher than in normal pregnancy. It returned to a normal level at about the fifteenth day of the puerperium. Nephritic toxemia was associated with a basal metabolic rate of about +33 before delivery. This figure was slightly higher than that for the pre-eclamptic group. The tendency for the basal rate in nephritic toxemia was to stay elevated for a longer time during the puerperium than it did in pre-eclampsia.

The basal metabolic curve for the eclamptic group was almost identical with the nephritic curve, hence basal metabolism determinations do not prove of any real help in differentiating between the various types of toxemias in late pregnancy.

In normal pregnancy, as well as in the different toxemias of pregnancy, there is some factor or factors, which result in an elevated basal metabolic rate as term is approached, a gradual return to normal ensuing during the puerperium. It is probable that such factor, or factors, may have to do with the growing product of conception, as well as a slightly increased activity of the thyroid gland.

The Blood Chemistry in Eclampsia. According to H. J. Stander and A. H. Radelet[3], the outstanding chemical findings in the blood of eclamptic patients are:

(1) A high uric acid; (2) a markedly increased lactic acid, not wholly due to muscular hyperactivity; (3) a decrease in the CO_2 combining power, which is very pronounced in certain cases; (4) a definite tendency towards a hyperglycemia, which is often associated with a high inorganic phosphorus.

There is usually no increase in the nonprotein nitrogen of the eclamptic blood. When such an increase is present, it may be associated either with a nephritis, upon which the eclampsia has been superimposed, or with the last stages of the disease. Furthermore, there is a slight,

(3) Bull. Johns Hopkins Hosp., June, 1926.

but definite decrease in the blood urea-nitrogen, as has already been pointed out by Stander.

At present, the authors are not in a position to state in how far the eclamptic blood picture is dependent upon the lesion usually observed in the liver.

The Blood Calcium in Eclampsia. An investigation of the blood calcium findings in eclampsia by S. M. Feinberg and A. F. Lash[4] was prompted by the following considerations suggesting a possible etiological relationship between the two. In the first place, it has been demonstrated that infantile tetany is associated with a decrease in blood calcium. Because of the clinical similarity of the latter condition and eclampsia it was only natural to expect similar findings here. In the second place, it is evident that the mineral metabolism of the maternal organism is enormously increased during pregnancy. This is especially true of calcium in the latter half of pregnancy, at which time a large amount of calcium is taken from the mother for deposition in the fetal bones. Consequently, it seemed logical to assume that when the mineral metabolism of the mother is unable to stand this calcium drain, a calcium poverty, manifesting itself in a hypocalcemia, would result; and that this condition possibly had some relation to eclampsia.

Furthermore, it is well known that during pregnancy osseous changes take place in the mother, such as softening of the bones and dental decay, all of which might be interpreted as evidence of disturbed calcium balance. It is a statistical fact that eclampsia is much more common in twin pregnancies. The increased calcium utilization in this condition would tend further to support the hypothesis that eclampsia may be due to a decrease of calcium in the blood.

Twelve cases of pre-eclamptic and eclamptic toxemias were examined but no appreciable relationship between the blood calcium and eclampsia could be found.

(4) Surg. Gynec. & Obst., February, 1926.

[This means that nature can obtain all the calcium needed for the fetus from the surplus in the food.—Ed.]

Lactic Acid in the Toxemias of Pregnancy. Eclampsia is associated with a pronounced increase in the lactic acid content of the blood, as was noted by H. J. Stander and A. H. Radelet[5] in a recent publication. It was this finding which made it imperative for them to ascertain whether similar changes could be demonstrated in the other types of pregnancy toxemia. With this in mind, they studied the blood lactic acid in certain cases of nephritic toxemia and low reserve kidney.

They found that in pregnancy complicated with low reserve kidney, the lactic acid in the blood is increased. This accumulation of lactic acid disappears as the patient improves. In pregnancy complicated with nephritis, there is a similar accumulation of lactic acid in the blood, which disappears with the improvement of the patient.

The factors which may possibly play a rôle in the accumulation of lactic acid in these two types of pregnancy are: (1) Decreased elimination of lactic acid; (2) decreased oxidation and interference with the resynthesis of lactic acid into glycogen; (3) a possible disturbance of the hydrogen-ion concentration of the blood.

[In 1915 Zweifel published his work on lactacidemia. He found it had no real significance in diagnosis.—Ed.]

Interagglutination of Maternal and Fetal Blood in the Late Toxemias of Pregnancy. The isoagglutination characteristics of the bloods of 375 normal and of 104 toxemic women and their newly born infants were studied by W. M. Allen[6]. He found no evidence that incompatibility is more frequent in toxemic than in normal gestation. Incompatibility between the bloods of mother and infant was present in 20.8 per cent. of 375 normal and 21.1 per cent. of 104 toxemic pregnancies. There was no evidence of an increased agglutinin

(5) Bull. Johns Hopkins Hosp., August, 1926.
(6) Bull. Johns Hopkins Hosp., March, 1926.

titer in the maternal serum of toxemic women nor evidence of specific immunization of the mother against fetal corpuscles. The discrepancy between this and previous work is probably accounted for by the size of the series studied. With a small number of cases the percentage of error and likelihood of coincidence are very great.

The study of this series of cases, by the methods used, gives no evidence that the late toxemias of pregnancy have their origin in isoagglutination phenomena.

A New Explanation for the Occurrence of Eclampsia in Pregnancy. The following explanation for the occurrence of eclampsia in pregnancy is offered by H. Elwyn[7]: There are two neuromuscular mechanisms for two vegetative functions, one, vasoconstriction, and the other, uterine contraction. The central controls for both of these mechanisms are close together in the interbrain and the impulses from both of these centers travel by way of the thoracicolumbar outflow of the sympathetic nervous system. With the progress of pregnancy the irritability of the whole neuromuscular mechanisms for uterine contraction becomes increased. The close proximity of the center for vasoconstriction in the brain permits the increased state of irritability to spread to this center. Impulses, passing from there through the fibers of the thoracicolumbar outflow, then cause the whole neuromuscular mechanism of the arterial system to become more irritable and the arteries to be in a state of greater tonic contraction. This irritability increases with the increase in irritability of the neuromuscular apparatus for uterine contraction in the course of pregnancy. It becomes more marked towards the end of pregnancy, and most marked at the time of labor. When the irritability of the neuromuscular apparatus for vasoconstriction is sufficiently high, it causes a general arterial spastic contraction to a varying degree, slowly or suddenly, and initiates all the manifestations which we

(7) Am. J. Obst. & Gynec., November, 1925.

have considered to be the result of this contraction. It lasts as long as does the irritability of the neuromuscular apparatus for uterine contraction, which is until the uterus has become involuted. It is for this reason that eclampsia occasionally occurs in the puerperium.

The increased irritability of the neuromuscular apparatus for vasoconstriction is probably present in a mild degree in every case of pregnancy. Only in some cases does it reach a sufficient degree of intensity to cause a general arterial spastic contraction resulting in the phenomena of eclampsia. The stimuli which may cause it to become irritable to an extreme degree are variable and include such factors as emotional stress or excessive physical effort. It is probable that the leakage of incompatible blood of the child into the circulation of the mother is such a stimulus. These stimuli not only increase the irritability of the neuromuscular apparatus for vasoconstriction but also that for uterine contraction and often initiate the contractions of labor.

This hypothesis which explains the occurrence of general arterial contraction in cases of pregnancy also serves to explain the occurrence of all the phenomena of eclampsia. It also offers a reason for the conservative treatment of eclampsia in pregnancy. The object of treatment should be to relieve if possible the arterial spastic contraction.

[Of the making of theories of eclampsia there is no end. Zweifel was right when he said that eclampsia is "the disease of theories."—Ed.]

Experimental Studies on the Toxemias of Pregnancy. Following acute histamine poisoning in pregnant guinea pigs, a number of phenomena have been observed by J. Hofbauer[8] which are highly suggestive of premature separation of the normally implanted placenta as it occurs in women: the separation itself, engorgement of the vessels of the uterus and broad ligament, uterine spasm, hemorrhage into various organs, marked shock

(8) Am. J. Obst. & Gynec., August, 1926.

and, histologically, edema of the uterine wall and degenerative changes in the liver and kidneys. In carnivora, under similar conditions, histologic changes are produced which are suggestive of those found in women who died of eclampsia: peripheral necrosis of the liver (both of the anemic and hemorrhagic type), associated with the formation of thrombi and bile stasis, and in the kidney, degenerative changes in the epithelium of the convoluted tubules.

On the other hand, the administration of histamin to carnivora over a prolonged period results in changes in the liver and kidneys suggestive of those encountered in pernicious vomiting. Moreover, evidence has been adduced to show that the production of such changes can be prevented by the simultaneous administration of insulin. The relation of histamine intoxication to the electrolytes in the blood, to the activity of the adrenals and the pituitary, and to the vasomotor center in the midbrain are discussed, and a possible explanation for the occurrence of hypertension is offered.

The striking similarity regarding blood chemistry in eclampsia and acute histamine intoxication is emphasized, and local anesthesia is suggested as the procedure of choice in operations for premature separation of the placenta and for eclampsia.

Transfusion forms an integral part of the treatment in severe cases of premature separation of the normally implanted placenta. The liberal administration of oxygen—combined with an appropriate supply of glucose—is advocated in severe cases of eclampsia. The possible sources of histamin during pregnancy and its biologic significance are discussed. Finally, it should always be borne in mind that pure histamin and the various substances in the histamin group—a number of protein derivatives of unknown structure—have a similar biologic effect upon the vascular system.

[As plausible and attractive these demonstrations are —so careful must one be in applying them to daily prac-

tice. Hofbauer himself is very modest in his deductions from his work, and one can agree with him in his clinical recommendations. The value of sugar in eclampsia has not been proven; that of local anesthesia has.—Ed.]

The Tendency to Acidosis in the Toxemia of Pregnancy. W. E. Levy[9] believes that he has definitely established that an acidosis exists in the pre-eclamptic state and in eclampsia. Believing also that a distinct difference exists between pre-eclamptic toxemia and a toxemia due to a previous kidney disease, he has attempted to classify his cases as such.

Briefly, he has included among those cases of pre-eclamptic toxemias such as show practically no renal involvement. This has been determined by making use of the phenolsulphonephthalein test, the diastatic activity test of the urine, the approximate estimation as to the relative amounts of serum albumin and serum globulin in the urine, the examination of the urine sediment for the various types of casts, and the chemical examination of the blood.

With the cases thus divided, the blood of the two types was next investigated along with the normal controls. As a result of the examination of the blood of 50 pre-eclamptics and eclamptics, it was found that there was a marked decrease in the blood sugar content, a lowering of the carbon dioxid combining power, and practically no change in the nitrogenous constituents. Furthermore, in quite a few of the more advanced cases, he was able to demonstrate acetone and diacetic acid in the urine. In those cases classed as nephritics, neither the blood sugar nor the carbon dioxid combining power was lowered.

The author also emphasizes that the total elimination of protein from the diet of this type of patient is not only not essential but undesirable. The fats are the elements that should be eliminated.

[Stander found hyperglycemia and great increase of

(9) Surg., Gynec. & Obst., July, 1926.

uric acid, but decrease of CO_2 combining power—the last the only point of agreement—in the blood of eclamptics.—Ed.]

Diet in the Treatment of Pre-Eclampsia. The results obtained by V. J. Harding and H. B. Van Wyck[1] from a study of the diet for pre-eclamptics, suggest strongly that in the treatment of pre-eclampsia, there is only one pertinent dietetic factor. It is the presence or absence of salt. Protein or fat, even in excess, produce no ill effects. It is true that an excess was not continued over a long period of time, but it was fed to patients already showing signs of "toxemia" and presumably therefore particularly susceptible to the error in diet, which might be responsible for their condition. That such patients are susceptible to a high salt intake only strengthens the argument for the innocuous nature of protein or fat.

The results obtained are encouraging from a clinical standpoint. It is certainly much more agreeable for the patient to be given a rational balanced diet, even though it be free from salt, than to live on a restricted milk or carbohydrate diet. The absence too of violent purgation and the forcing of fluids cannot but be beneficial to the patient's state of mind, and thus render more effective the necessary rest in bed, for it is to this latter part of the treatment that the authors attribute such falls in blood pressure as they have observed. The total restriction of salt should not be carried out over an excessively long period of time though it may be true that the body has reserves of chlorid upon which it can draw in time of need. When one is convinced that no further benefit accrues by rigid salt restriction, 3 gms. are added to the diet. This quantity is sufficient to maintain equilibrium.

The results are undoubtedly beneficial to the mother though the child does not always escape death. Not one of the cases studied, however, developed convulsions

(1) J. Obst. & Gynec., Brit. Emp., 1926, Vol. 33, No. 1.

and headaches and eye symptoms were much improved. The albuminuria, however, did not always disappear.

How are such results to be interpreted? Are we to consider the edema as the inevitable result of a nephrosis, or are both merely symptomatic of a more generalized vascular disturbance? The authors would incline to the latter.

They suggest the inclusion of one salt-free week in four as a prophylactic measure against pre-eclampsia in addition to the usual pre-natal care.

[For a time the Editor prescribed a salt-free diet for pre-eclamptics, without effect. Absolute milk diet did not stop the disease; no diet seemed to help in all cases. Now he prescribes a salt-poor and protein and fat poor diet, with rest in bed and free use of water. If no result in a week or 10 days—emptying of the uterus.]

Present Status of the Toxemias of Pregnancy. The types of toxemia considered by J. O. Polak[2] are hyperemesis, the pre-eclamptic toxemias and eclampsia. That pernicious vomiting is a serious complication of pregnancy is evidenced by the fact that it has a mortality of more than 20 per cent. In the mild cases, certain hygienic and dietetic principles must be impressed on the patient. First, there must be insistence on marital abstinence, for pelvic reflexes always increase the gastric irritability. Second, to combat the dehydration and consequent toxicity there must be a copious ingestion of water, usually in the form of some alkaline water. Third, to meet the carbohydrate deficiency we must insist on an increased intake of carbohydrates in the form of cereals, fruit juices with sugar, puddings, custards, chocolate or candy.

These general principles should be supplemented by rest in bed after meals, and the internal administration of small doses of thyroid extract. Should the vomiting persist and the patient lose weight, rest in bed with absolute isolation is to be insisted on; and the fluid

(2) J. A. M. A., July 24, 1926.

loss made up by the hypodermoclysis, enteroclysis and the intravenous injection of glucose solutions, amounting to 1000 c.c. daily of 10 per cent. solution, until diuresis is produced.

When glucose alone or in combination with insulin fails to produce improvement, Polak has employed transfusions of 300 c.c. of human blood by the direct method, to which is added 500 c.c. of physiologic sodium chlorid solution. The success of these procedures has been so satisfactory that he has not had to empty the uterus for vomiting in a period of nearly five years.

It must, however, be impressed on the attendant that if, under this plan of treatment properly carried out for a period of a week, diuresis is not produced and the vomiting continues, the uterus should be emptied.

In the study made by Herrick at the Sloane Hospital, where every toxemia of the latter months is studied by the internist as well as by the biochemist and the obstetrician, they have come to the conclusion that the woman who develops a pre-eclamptic toxemia or an eclampsia is the woman who starts on her pregnancy with defective emunctories or an unbalanced endocrine system.

Neither blood chemistry nor metabolic rate throws much light on the etiology or prognosis. Furthermore, the clinical manifestations, those that may be observed by any keen practitioner, are of greater significance.

The pre-eclamptic toxemias are usually considered under:

1. The hepatic type, which is commonly of sudden development with a nephrosis, as the kidney lesion without any pre-existing history of renal disease.

2. The renal type, in which nephritis is a contributing etiologic factor. The clinical distinction between these two types in antepartum toxemia is difficult to make, though in the former there is a previous history of renal disease, while in the latter there is always some clinical evidence of pre-existing kidney lesion. How-

ever, after the labor is terminated, the hepatic type is shown by the relatively quick return of the blood pressure and kidney function to normal, while in the renal type it may take months to clear the urine of albumin and casts, and the blood pressure never ranges below 140.

The treatment of the pre-eclamptic state and of eclampsia is essentially medical. The obstetric problem comes in for consideration only when labor is established by the convulsive seizures. Notwithstanding the fact that convulsions cease in 52 per cent. of the cases when the uterus is empty, we are not justified by the results in any extensive series of clinical observations in making delivery the first consideration in view of the poor surgical risk. Naturally the treatment of the latter month toxemias resolves itself into:

1. Prevention. One of the greatest strides in preventive medicine has been the antepartum care given to the pregnant woman. It has resulted, in many clinics, in the passing of eclampsia.
2. The control of the convulsion.
3. The management of labor in the presence of convulsions when labor has started.

When no improvement is shown under treatment, pregnancy must be terminated by obstetric procedure. The method should be determined by the existing obstetric condition, always keeping in mind that the toxic patient is a poor surgical risk, bearing anesthesia poorly, liable to shock, and more susceptible to infection than her better equipped sister. Haste and trauma must be avoided.

In the presence of convulsions, the indications are never surgical. With the appearance of the first convulsion, the woman should be given (hypodermically) ¼ gr. (16 mg.) of morphine sulphate; placed in bed in the Trendelenburg posture, and turned on the side to allow the mucus to drool from the mouth. The tongue must be protected by a "gag"; the bladder is emptied by catheterization. If the pressure is 150 or more, 1000

c.c. of blood should be withdrawn. This may be replaced by 500 c.c. of a 10 per cent. glucose solution. The morphin is repeated in an hour, and nothing else is done.

Unless the convulsions recur and the supervening coma increases to a degree that the patient remains comatose between convulsions, this condition is an indication for the intravenous use of magnesium sulphate in quantities of 100 c.c. of a 25 per cent. solution, which has had a most kindly effect, diminishing the cerebral edema and controlling the occurrence of subsequent convulsions.

The management of labor in the presence of eclamptic convulsions is based on the three principles of: (1) avoiding trauma; (2) preventing infection, and (3) diminishing the shock—for the eclamptic patient is a very poor surgical risk.

Polak's plan has been to disregard the labor until complete dilatation of the cervix is obtained when, if the head is engaged and at the spines, delivery may be expedited by the use of low forceps under light oxygen-ether narcosis added to the morphin analgesia.

Cesarean section has been limited to those cases in which there was a definite obstetric indication and not employed as a routine for rapid delivery. The author's experience shows that prevention is the keynote of success; the toxic patient needs active treatment with the first appearance of hypertension; convulsions may be prevented by induction of labor when medical means fail to reduce tension and produce diuresis, and the treatment of eclampsia is essentially medical, and surgical delivery has only a limited field.

Eclampsia at the Chicago Lying-in Hospital; Immediate and Late Results. In this report by J. P. Greenhill[3] are analyzed the cases of eclampsia treated at the Chicago Lying-in Hospital from July 1, 1917 (when the new hospital was opened), to January 1, 1926. During these eight and one-half years there were 29,587 ob-

(3) J. A. M. A., July 24, 1926.

stetric patients. Of this number, 20,226 were delivered in the hospital and 9,361 were delivered at home by the dispensary service. Among these 29,587 patients there were 83 who had eclampsia, an incidence of 0.28 per cent. Five of these women who were delivered at home were colored and were sent to other institutions. The remaining 78 patients with eclampsia were admitted to the Chicago Lying-in Hospital, and a study of these cases forms the basis of this paper.

The analysis of these cases indicates that treatment in most of the cases was directed toward emptying the uterus. The method chosen depended on the condition of the patient, the size of the baby and the state of the cervix. The results obtained (a maternal mortality of 7.7 per cent. or 6.5 per cent.) are better than the results published by most authors. In spite of the fact that many babies were nonviable, the total fetal mortality was but 27.7 per cent., and only 20 per cent. if the fetuses that were dead on admission to the hospital are deducted. Since a large proportion of the 72.3 per cent. who left the hospital alive were premature and many were toxemic, we have here an indication of the value of proper hospital care for premature babies.

A word of caution may not be amiss concerning phlebotomy. As indicated in the analysis, almost one-third of the patients lost more than 500 c.c. of blood at the time of delivery, showing that patients with eclampsia can bleed excessively. Hence, one should not draw off much blood therapeutically before labor, especially if the patient is small and undernourished.

The matter of prenatal care is worthy of discussion. The present analysis shows that 59 per cent. of the patients had absolutely no observation before the attack of eclampsia, but that 18 per cent. had good prenatal care. While the latter figure is unusually high, it nevertheless indicates that a certain small number of patients will develop eclampsia even under the best of care, unless the pregnancy is terminated when symptoms of

toxemia increase. These patients can often be recognized during pregnancy because they frequently are of the "pituitary type," with a tendency to hard obesity, masculine pelvis, masculine distribution of hair, and thick skin. Patients with toxemia ill enough to require treatment during pregnancy in a hospital should not be permitted to leave the hospital until they are delivered.

The follow-up study indicates that the large majority (91.7 per cent.) of women who did not succumb to eclampsia recovered completely, and of the five women (8.3 per cent.) who had chronic nephritis after the eclampsia four were known to have had chronic nephritis before the eclampsia. The fifth may also have had nephritis before eclampsia, but Greenhill could not determine this. It appears, therefore, that chronic nephritis is rarely found after eclampsia unless the patient previously had nephritis.

An appreciable number of the normal patients who subsequently became pregnant had a recurrence of the symptoms of toxemia. In the present series the incidence was 26.7 per cent. In other words, the patients who recovered completely after having had eclampsia remained normal as long as they did not become pregnant. When these patients subsequently became pregnant, more than one-fourth developed signs and symptoms of toxemia. This probably means that, in a certain proportion of cases, eclampsia does cause a permanent derangement of the kidneys and perhaps other organs; but this derangement is not detectable by our usual methods of examination. Perhaps some new chemical studies of the blood and urine will reveal those patients who are likely to develop toxemia during pregnancy.

A summary of the study shows that among the 78 cases of eclampsia analyzed there were 6 maternal deaths (7.7 per cent.). If we deduct one moribund, untreated patient, the mortality is 6.5 per cent. In 50 per cent., the convulsions began before labor; in 20.5 per cent.,

during labor, and in 29.5 per cent., after delivery. The maternal mortality for these groups was 10.3, 0 and 8.7 per cent., respectively, and the fetal mortality was 41, 18.8 and 17.4 per cent., respectively.

The incidence of operative deliveries was 62.5 per cent. However, while 36.3 per cent. of all the labors terminated spontaneously, labor had been induced in 11.3 per cent. of them. Hence, only 25 per cent. of the patients had both a spontaneous onset and spontaneous termination of labor.

Convulsions ceased after delivery in 78.2 per cent. of all the cases in which they began ante or intra partum. Among the 15 abdominal cesarean sections, convulsions began before operation in 12, and in all of these cases the convulsions ceased after operation.

The maternal mortality for the various forms of delivery was: spontaneous 3.4 per cent.; cesarean section, 6.7 per cent.; forceps, 9.5 per cent., and version and extraction, 14.3 per cent. The fetal mortality for these groups was: forceps, 9.5 per cent.; abdominal cesarean section, 17.6 per cent.; version and extraction, 28.6 per cent.; spontaneous, 30 per cent., and vaginal cesarean section, 100 per cent.

Of the 78 patients, 59 per cent. had no prenatal care, 23 per cent. had very poor observation during pregnancy, and 18 per cent. had good prenatal care.

There were 5 pairs of twins (6.4 per cent.). Among the 83 babies there were 23 deaths (27.7 per cent.). However, the fetal mortality of the 75 babies that were alive when their mothers entered the hospital was only 20 per cent. Of the 15 dead babies that constitute this 20 per cent., only one weighed more than 2,000 gm. (4 pounds, 7 ounces). Only 26.7 per cent. of all the babies weighed 2,000 gm. or more.

Of the 72 patients who left the hospital alive, 60 (83.3 per cent.) were traced. Of this number, 2 died of chronic nephritis, 3 now have chronic nephritis, and 55 (91.7 per cent.) are well. Among 18 subsequent preg-

nancies, ten ended normally and one is in progress now. One patient had another attack of eclampsia, and 3 had pre-eclamptic symptoms for which the pregnancies were ended. Hence, among the patients who completely recovered after the attack of eclampsia, 26.7 per cent. of those who subsequently became pregnant developed signs and symptoms of toxemia. These patients again recovered completely.

As a result of this study the author feels that the treatment of antepartum and intrapartum eclampsia should not be entirely conservative nor entirely radical. However, in experienced hands he favors emptying the uterus in most cases, and the method selected depends on the condition of the patient, the size of the baby and the state of the cervix. Where the patient is a primipara with a viable baby and the cervix is undilated, he prefers to terminate pregnancy by a low or cervical cesarean section under local anesthesia as soon after the first convulsion as possible. He believes that all patients with eclampsia should be sent to a hospital. When a patient must remain at home the treatment should be conservative. It should also be conservative in a hospital when the attending physician is not skilled in operative obstetrics.

[All statistics must be judicially scanned before acceptance. The Editor prefers the stated opinion of a man qualified to judge masses of figures. The cases forming the basis of Greenhill's paper passed under the eye of the Editor,—a goodly proportion were treated by him, and the percentage of recoveries, 93.5 per cent., encourage him toward an active treatment of eclampsia,—tempered, of course, by a strong individualization of cases.]

Toxemia of Pregnancy; 879 Cases with Convulsions at the New York Lying-in Hospital. It has been the privilege of A. B. Davis and J. A. Harrar[4] during the last 30 years at the New York Lying-in Hospital to study

(4) J. A. M. A., July 24, 1926.

of the convulsive type, commonly known as eclampsia. and in part to treat 879 cases of toxemia of pregnancy These cases have consecutively occurred in a series of 152,248 confinements in the combined indoor and outdoor services.

During this time the authors' conception of the control and treatment of the disease has varied greatly. The pendulum of procedure has swung back and forth, and while they may be still far from a scientific treatment based on an accurate etiology, they at least have come to believe that the eclamptic patient is as much a medical as an obstetric problem, and with the accompanying corollary, that obstetric intervention should be for obstetric indications only, and not for the convulsions.

Their results in delivery of eclamptic patients by abdominal cesarean section have not been encouraging. In 54 patients so delivered, 12 mothers died, a mortality of 22 per cent.; while in a series of 42 delivered by vaginal cesarean section, 8 died, a mortality of 19 per cent., practically the same as by all other methods.

The gross mortality in the series, including 23 who died undelivered shortly after admission, was 23 per cent., 203 deaths in 879 cases. In 1905, in the 150 cases of eclampsia then on the records, the gross maternal mortality was 36 per cent. This was at a time when delivery by accouchement forcé was at the height of its popularity. In 1918 the use of large doses of morphin, combined with a patient and conservative handling of the delivery, came to be generally employed throughout the hospital and with marked effect on the maternal mortality, so that of 147 patients with antepartum and intrapartum eclampsia consecutively delivered since then to date, and including 7 who died undelivered, only 23 have died, a gross mortality of 15 per cent. This reduction has been most impressive, yet the authors must recognize that the routine use of large doses of morphin is empiric rather than scientific and they do not wish

to make extravagant claims for it. Curiously enough, it seems to be of no especial value in the reduction of the mortality rate when used in postpartum eclampsia.

The results for the baby with the large doses of morphin and the more conservative method of delivery would indicate that the dangerous effect of large doses of morphin on the fetus has been overestimated. One might almost be tempted to believe that the baby has a better chance with it, as the convulsions of the mother are frequently controlled, and there is less danger of asphyxia for the child. Prior to 1919, in 472 consecutive deliveries of eclampsia patients, there were 175 stillbirths, a stillbirth mortality of 37 per cent., and 86 babies who died after delivery, or 18 per cent. These added give a gross fetal mortality of 55 per cent. Since 1919, when the large doses of morphin were more freely used and the authors' conception of obstetrical intervention became more limited to obstetric indications, there has been a great reduction in the stillbirth rate and in the babies dying after delivery. In the 134 consecutive deliveries since 1918, 29 babies were stillborn, or 21 per cent.; and 18 died after delivery, or 13 per cent.—a gross fetal mortality of 34 per cent. as compared with the previous 55 per cent.

Naturally, the first endeavor in the treatment of eclampsia is to avoid the occurrence of the condition. Several patients delivered in the past year have impressed the fact that observations during the latter part of pregnancy at intervals of two weeks are not sufficient, and that all pregnant women should have urine and blood pressure examinations made at least once a week during the last 2 months. A trace of albumin in the urine is so common a finding in many pregnant women during the latter months that blood pressure elevations are much more indicative of danger ahead. Investigation of the blood chemistry made by Dr. Losee in the hospital laboratory several years ago proved of no value for any assistance in prognosis or treatment.

Practically every eclamptic patient admitted is given ½ gr. of morphin hypodermically, at once. This can be done quickly, and soon holds or controls the convulsions. The alimentary tract is emptied by means of colonic irrigations and lavage, followed by 2 ounces of magnesium sulphate through the stomach tube in situ. The free use of morphin is then continued in quarter grain doses hypodermically, its physiologic effects being kept well in evidence. The authors rarely induce labor for the convulsions, and many patients fall in labor spontaneously. Labor should be encouraged and may be shortened safely by easy low forceps.

As to the employment of phlebotomy in the treatment of eclampsia, it is no new departure. For many years the authors bled in certain cases, in some of which the improvement was almost startling. In plethoric women, bleeding at delivery is encouraged. Often eclamptic patients bleed very very little. In the type in which convulsions continue after labor, phlebotomy is of the greatest value. It is a mistake to bleed every patient, especially after delivery. One occasionally sees a patient have a sudden fall of blood pressure and the appearance of cardiac failure after delivery. This is likely to be accompanied by pulmonary edema, a common cause of death in eclampsia.

One attack of eclampsia does not necessarily predispose to an attack in a subsequent pregnancy. The authors no longer advocate prompt delivery of eclamptic patients by cesarean section. They still believe that in patients who have been under close supervision and who cesarean section.

Magnesium Sulphate Intravenously in the Care and Treatment of Pre-eclampsia and Eclampsia. According to L. G. McNeile and J. Vruwink[5], in the pre-eclamptic type of toxemia, the intravenous injection of 20 c.c. of a 10 per cent. solution of magnesium sulphate nearly

(5) J. A. M. A., July 24, 1926.

always gives immediate relief from subjective symptoms. Administration of the drug is usually followed by some reduction in blood pressure, reduction of edema (probably including cerebral edema), and an increased output of urine.

During the convulsive stage of a toxemia of pregnancy, the intravenous injection of 20 c.c. of a 10 per cent. solution of magnesium sulphate will generally stop, or at least limit, the number of convulsions. It may be, and usually is necessary to repeat the injection, both for the control of convulsions and for the relief of other toxic symptoms. Usually one or two injections are sufficient, though as many as 8 in 24 hours have been given.

The mortality rate at the Los Angeles General Hospital in the preceding five years was 36 per cent. With magnesium sulphate, this was reduced to 14.8 per cent., a reduction of 60 per cent. The evident excellent results attained by the intravenous injection of magnesium sulphate and no other measures naturally led to its use in pre-eclamptic toxemias, so that of 45 patients with definite pre-eclampsia, only six developed convulsions after its use.

In spite of the reduction of a gross mortality of 36 per cent. to a gross mortality of 14.8 per cent., in the General Hospital eclamptic series, the greatest enthusiasm centers about the reduction in morbidity in the pre-eclamptic series. Prophylactic magnesium sulphate intravenously in 23 cases prevented convulsions, except in three cases, and in the entire series there was not a single cesarean section. The authors believe that, if there is no constant and protracted alleviation of symptoms, the best interests of mother and baby are served by interrupting the pregnancy. In the primipara, they prefer cesarean section under local, gas or spinal anesthesia, and in the multipara, by more conservative measures. Repeated records show, however, that patients, even

after repeated convulsions, may be carried several weeks to term and spontaneous labor.

The authors conclude that the intravenous injection of a 10 per cent. solution of magnesium sulphate is a valuable adjunct in our treatment of the toxemia of pregnancy. It will cause some reduction of blood pressure, reduce edema, increase urinary output, and reduce or control other symptoms. It will control the convulsions of eclampsia in nearly every case, and exercises a favorable influence on the other symptoms of eclampsia and it is a safe procedure.

The Conservative Treatment of the Toxemias of Pregnancy. G. W. Kosmak[6] maintains that conservative practice coupled with preventative measures, may be said to have stood the test and until time has revealed to us the cause or causes of pregnancy toxic states, we should be content to follow the lines dictated by observation and experience.

It may be that there is more than one toxic substance as the cause but until we find it, or them, no specific form of therapy is possible and we can merely make the effort to combat successfully the overpowering substance and its effects, for that is Nature's way and we must aid her. Getting rid merely of the fetus is a cowardly admission of defeat, although occasionally it must be resorted to when less radical measures have failed.

[It is better to be a live coward than have a dead patient.—Ed.]

In the excessive type of vomiting the metabolic balance may be disturbed and loss of weight results. Here a vicious cycle must be broken and the quickest way is to stop mouth feeding, where a carbohydrate diet, fluids, alkalies, catharsis and mild sedatives have had little or no effect. Then resort must be had to rectal feeding with weak sugar solution and alkalies, rest in bed, preferably in a hospital, sedatives to the full physiologic effect until

(6) Long Island M. J., June, 1926.

mouth feeding can be resumed. In these cases uterine displacements should be corrected with pessaries. In most instances the relief of dehydrated patients by intravenous infusions of 500-1000 c.c. of a 5-10 per cent. glucose solution almost invariably turns the tide in the woman's favor, and in a few days mouth feeding may again be attempted. The use of insulin is still on trial and more extended observations on a larger series of cases are essential to establish its value. Notwithstanding the good results of the conservative measures in so many cases, isolated instances may call for abortion as the only salvation.

Taking up the disturbances of the later months, ordinarily known as the eclampsias, the frequently sudden onset and the severity of the symptoms have often prompted in the past most rapid and radical interference with gestation in an attempt to save the patient. And yet, as shown by present experience, how false this attitude has been. Experience makes it safe to assume that delivery of the baby is a secondary consideration but that the patient must be put at rest, preferably in a hospital, her emunctories stimulated, a state of narcosis instituted and high blood pressure, if present, reduced by venesection. Morphin, chloral, magnesium sulphate (intravenously and intramuscularly), paraldehyde, have all been made the features of conservative methods of treating eclampsia and the good results are available in the literature of the subject. Suffice it to say that such procedures largely aided by appropriate prenatal care, have markedly reduced the virulence and the incidence of eclampsia and the convulsive type in particular is becoming much rarer at the present time.

The Intravenous Magnesium Sulphate Treatment of Eclampsia. In May, 1925, E. M. Lazard, J. C. Irwin and J. Vruwink[7], were appointed a committee of the Los Angeles Obstetrical Society to collect and report on all available cases which had been treated by the intra-

(7) Am. J. Obst. & Gynec., July, 1926.

venous use of magnesium sulphate. They have now records of 142 cases, reported from hospitals and doctors in and around Los Angeles, a few being reported from more distant points.

For purposes of this study, they have included under the term "eclamptic toxemia," all toxemias of pregnancy which have resulted in convulsions or, in which treatment has been directed toward the prevention of convulsions (pre-eclamptic toxemias).

Pre-eclamptic Toxemias.—There have been 45 cases, 23 General Hospital and 22 outside cases of toxemia, which have received intravenous magnesium sulphate, in addition to the usual pre-eclamptic treatment, in an attempt to prevent the occurrence of eclampsia (convulsions and coma). They received doses of from 1 injection of 20 c.c. to 24 injections of 20 c.c. each, this last one over a period of 23 days.

Of the 45 patients, 6 developed convulsions, 4 of whom had but 1 injection, 1 had 4 injections and 1 had 3 injections.

Eclamptics.—In the eclamptic series (those who had one or more convulsions) there were 103 patients, of whom 54 were General Hospital patients, and 49 outside ones, their ages ranging from 12 to 44 years. Of these 103 patients, there were 69 primiparae. There were 50 antepartal, 25 intrapartal, and 28 postpartal eclampsias.

There were 14 deaths from all causes in the entire series, a gross mortality of 13.6 per cent. Of these 14 patients who died, 1 recovered from her eclampsia and died 3 weeks later from sepsis and 1 died of surgical shock from section, 6 days after recovery from eclampsia. These 2 cases should be figured as recoveries from the eclampsia. One patient was moribund when she first came under observation, and 2 were proved, by autopsy, to be straight nephritic uremias without any typical eclamptic changes.

Of the 54 General Hospital cases, 90 per cent. first came under treatment from 2 to 15 hours after the beginning of the eclamptic attack and were admitted in convulsions or in posteclamptic coma. Of these 54, there were eight deaths, a mortality of 14.8 per cent. In the five years immediately preceding the institution of this method of treatment, the mortality rate at the General Hospital was 36 per cent.

In this series of cases, of the 50 antepartal cases, there were 14 or 28 per cent. which recovered from the eclamptic attack and went from 3 days to 6 weeks before delivery without further eclampsia.

Of the 67 cases delivered after the treatment was instituted, there were 47 spontaneous labors, 10 forceps extractions, 3 versions, 1 breech extraction, 8 bag inductions and 8 cesarean sections. Cesarean section was only done for absolute obstetric indications and with consent of the senior attending obstetrician.

The Improved Prophylactic Method of Treating Eclampsia with Comments on the Variations Suggested by Williams, Stander, Speidel and King. Of 300 eclamptic patients treated by B. Stroganoff[8], 8 died, (2.6 per cent.). Of the latter, 4 arrived at the clinic moribund and died in from 3 to 8 hours after admission. In 40.3 per cent. of the 300 cases, there was not a single convulsion from the beginning of the treatment; in 44.7 per cent. there were from 1 to 4 seizures, and 4 or more in 15 per cent.

The author observed a great number of "intercurrent eclampsias," *i.e.*, cases in which there is freedom from convulsions for 12 hours or more before delivery. In 5 cases, (1.6 per cent.) there were psychic disturbances.

The mortality among children is relatively favorable, amounting in the whole group to 16.6 per cent. But if prematurely born children (weighing less than 2000 gm.) that died from exposure, operations and so forth, before

(8) Am. J. Obst. & Gynec., June, 1926.

treatment was begun, be excluded, the fetal mortality from eclampsia is 6 per cent.

There was not a single maternal death due to treatment. It is known that in the treatment of eclampsia by forced delivery, approximately 4 per cent. of the mothers die as a result of the operation. There was a relatively small number of operative deliveries, 50 per cent. There were a few cases (1.3 per cent.) of pneumonia.

In 1918, Stroganoff was able to collect from the literature, which is far from complete, 2,208 cases of eclampsia treated by the old method and its variations, with a total maternal mortality of 9.8 per cent. Among 878 children, born of eclamptic mothers, whose history is recorded, the mortality after treatment by this method was about 12 per cent. less than in cases treated by other methods in the same clinics. A further search of the literature by Hinselmann revealed 1,094 additional cases treated by the old method, up to 1924, which increases the number of cases to 3,302, of which 357 (10.8 per cent.) terminated fatally.

[The Editor has refrained from comment upon the statistics presented in this symposium on eclampsia, and particularly from making comparisons, although his own figures are so good that he might have been pardoned if he had placed them against those here published. The reason is that no one—not even himself, has properly defined what eclampsia is and since we all are not agreed on what should enter into the statistics, these are practically worthless for any purpose. Women can have convulsions from hepatic disease, kidney disease, cerebral disease, etc., and without autopsies we can seldom say which existed. If a man could report the details of 500 cases of positive hepatic convulsive toxemia, and also those of 500 cases of positive nephritic toxemia, one might be privileged to compare methods of treatment, or deduce from a study of the cases that the medicines did or did not affect the course of the disease. How many of Davis' fatal cases had tuberculous, or other

meningitis? How many nephritis with cerebral hemorrhage? Did the mortality in his cases occur in the women that had convulsions because the diseased kidneys could not stand the strain of pregnancy or in those where the liver proved default? Did magnesium sulphate cure the cases of true eclampsia or fail in them, while it helped the women whose kidneys were affected primarily? Unless we know these points we cannot make any deductions as to the value of the remedy, compared with other methods of treatment.

We lack a good classification of the toxemias of late pregnancy. The Editor has found, clinically, that all the cases can be placed in one or two of the following classes:—(1) The nephrosis, or the simple "Kidney of Pregnancy" (v. Leyden); (2) the true eclampsia, of liver origin; (3) chronic nephritis; (4) essential hypertension; (5) chronic nephritis; (6) focal infection nephritis, acute and chronic. These conditions may or may not terminate in convulsions. When they do, it is *usually* possible to say this case is purely hepatic, toxemic, or that one, nephritic, primarily. Autopsies are more common in the hepato-toxemic patients; the immediate prognosis is better in those of the nephritic type.]

The Use of Insulin in Eclampsia. According to H. J. Stander and E. E. Duncan[9], the blood sugar level and the CO_2 combining power give us a fairly reliable index of the severity of eclampsia. In the milder forms of eclampsia the CO_2 combining power of the blood is not greatly decreased, while in the severe cases, especially where the patient remains comatose following a convulsion, there is a most unusual drop in the CO_2 combining power. Furthermore, eclampsia is associated with a definite hyperglycemia.

At present the treatment of eclampsia at the Johns Hopkins Hospital is as follows: As soon as the patient is admitted, the modified Stroganoff treatment is started; a specimen of blood is obtained and a chemical analysis

(9) Am. J. Obst. & Gynec., December, 1925.

done immediately. The sugar and CO_2 values are carefully noted, and should these show an undue rise in the blood sugar and a decrease in the CO_2 combining power, from 15 to 25 units of insulin are administered. With the insulin a protective dose of glucose is usually given, which is about 2 gm. of glucose per unit of insulin. With a marked hyperglycemia, it is perhaps not necessary to give glucose with the insulin, but in such cases it is advisable to have orange juice available should the patient develop a hypoglycemia.

The indications for the use of insulin in eclampsia are, therefore, coma or semiconsciousness following a convulsion together with a CO_2 combining power of 30 or below and an elevated blood sugar. The dosage of insulin is gauged by the degree of hyperglycemia and the weight of the patient. Only 6 cases are reported, but the results were so good that the authors considered it advisable to publish these results.

Glucose and Insulin in the Treatment of the Vomiting of Pregnancy. For the last two years in the obstetric service of C. J. Miller at the Charity Hospital of New Orleans, E. L. King[1] has treated hyperemesis gravidarum along the lines suggested by Titus (glucose) and Thalheimer (glucose and insulin) and it is his purpose to put on record 7 cases thus handled. The number is small as only the patients suffering from the severer types of toxemic vomiting are admitted to the ward, the ambulant cases being cared for in the clinic. The results have been much more satisfactory than those obtained when other methods of treatment were employed. The condition of each patient when admitted was serious. In 4 cases the improvement was so prompt and so striking that resort to therapeutic abortion was no longer indicated. One patient was hopelessly ill on admission and died in spite of treatment with glucose and insulin, combined with the induction of abortion. Another patient who was extremely toxic, was not benefitted by this

(1) J. A. M. A., May 8, 1926.

treatment, and refused for religious reasons the therapeutic abortion that was clearly indicated. She died of toxic myocarditis four weeks after the vomiting had been checked by the use of the duodenal tube. The last patient treated was apparently much benefitted, but relapsed and therapeutic abortion was induced with a resulting cure.

In one case treatment by the duodenal tube succeeded, as far as controlling the vomiting was concerned, after the intravenous administration of glucose had failed. The author had attempted to pass the tube several times in patients not included in this series, but failure has been the rule. It appears that this method has great merit, provided one is so fortunate as to succeed in passing the tube through the pylorus.

From this small series, it appears justifiable to conclude that this method of treatment is of decided value, and constitutes a definite advance over the methods formerly employed for the relief of patients suffering from the toxemic vomiting of pregnancy. King feels that the use of insulin with the glucose is to be preferred as his impression is that more prompt relief is thus obtained than by the employment of glucose alone.

Glucose and Insulin in the Toxemias of Pregnancy. For the last 5 years C. J. Miller[2] has been using glucose in the treatment of the toxemias of pregnancy and for the last several months he has been using it in connection with insulin. The success of the method has induced him more than any other one thing, to rely upon conservative measures in handling such cases. Routine measures are naturally employed also, but to his mind it is the glucose and insulin which turns the trick. The proper administration of the glucose is of the utmost importance. Proctoclysis is unreliable; hypodermoclysis, while better, is not entirely satisfactory and the ideal method is intravenous infusion. He has been using a 5 per cent. solution in the ordinary case, and giving one

(2) Am. J. Obst. & Gynec., June, 1926.

unit of insulin for every 3 gm. of glucose until 10 to 15 units have been given altogether. Moreover, he has found it safe to repeat the procedure as indicated. The insulin of course, is given by needle.

While the author has made no detailed study of his records he says that in the last 5 years at least, 40 cases of toxemia and 20 of eclampsia have been treated by his individual modification of the Stroganoff method, combined with glucose with excellent results. Lately, he has added insulin to the method and the results have been even more brilliant. He believes the treatment is worthy of systematic adoption in an obstetric service.

[Titus insists that insulin is not alone unnecessary, but actually harmful in hyperemesis. He says that the conversion of the sugar will take place if only it be supplied. Insulin will cause a too rapid conversion and deplete the already scanty storage in the liver. The Editor has used insulin with the dextrose three times, twice without effect; once it seemed to do more than plain glucose. Our routine treatment for the pernicious vomiting of pregnancy is as follows: rest in bed, isolation from family, if not already done, starvation for 24 hours, hypodermoclysis of 5 per cent. dextrose solution, 2 quarts, saline solution 2 quarts per day, proctoclysis of tap water, as much as possible, sodium bromid 1 dr. per rectum every 4 hours for 8 doses. After 24-36-48 hours, dry diet, i.e., a chop and dry cracker, or baked potato; a sliver of chicken with buttered toast, etc. All through large doses of well directed suggestive therapeutics. In the mildly toxemic and neurotic varieties of vomiting these measures will quickly relieve the excessive dehydration and acidosis and sugar hunger and produce evident improvement. Failing this duodenal feeding is instituted and here orange juice and proteins can be added to the other remedies. Intravenous glucose with or without insulin is also used. If the patient does not get better very soon, if rapid pulse, fever, mental dulness, exhaustion, hematemesis, jaundice, cyanosis, keton-

uria, albumenuria develop in spite of what you do, it is best to perform therapeutic abortion, and do it a little too soon and too often, rather than too late. Those men who claim it is never necessary to do therapeutic abortion in these cases have not had enough experience.]

Observations on the Treatment of the Edema of the Toxemia of Pregnancy with Ammonium Chlorid. Edema of varying degree is almost always evident in cases of pre-eclamptic toxemia, regardless of whether the toxemia is of the so-called true eclamptic or of the nephritic type. There is also a definite increase in weight, and usually a rise in blood pressure. In fact, a rapid gain in weight may be an early sign of toxemia.

The edema of pre-eclamptic toxemia when marked and accompanied by hypertension and albumin in urine is indicative of a grave condition. Headaches, dizziness, and finally eclamptic convulsions may occur, and the question of whether they are due directly to a toxin or to edema of the brain accompanying the toxic condition, may be disputed. It is a fact, however, that relief from the edema is accompanied by improvement of symptoms. Relief from edema is secured by the removal of the excess fluid from the body, chiefly by increasing the urinary output.

Diuresis may spontaneously follow rest in bed, especially if the patient is on a diet low in water, salt and protein. It may occur after venesection in the presence of marked hypertension, and is often associated with removal of toxic material from the bowel by catharsis or flushing the colon. Various drugs have been used for their diuretic effect.

Last year findings in a group of patients with toxemia of pregnancy, whose clinical symptoms resembled those of acute glomerulonephritis were reported. Following Keith's suggestion, R. D. Mussey[3] first used calcium chlorid, and later ammonium chlorid for their diuretic effect in a small group of similar cases. Calcium chlorid

(3 Am. J. Obst. & Gynec., February, 1926.

was discarded because it is particularly distasteful, frequently causing nausea and vomiting. Ammonium chlorid was given in tablet form until gelatin-coated capsules containing 1.5 gm. were obtainable. Its use was generally followed by prompt diuresis, disappearance of edema, marked loss of weight, lowered blood pressure, and general improvement of the patient. In most cases the improvement was greater and more lasting than that obtained by dietary and other measures.

The patients under observation were kept at rest in bed. The daily diet was limited to 1500 calories containing 50 gm. of protein, with a minimum of salt, and 800 c.c. of fluid. Up to 10 gm. of ammonium chlorid were given by mouth daily, even after diuresis was effected, and if possible, until the edema disappeared. Usually a total of from 50 to 100 gm. of ammonium chlorid was given. Following the disappearance of edema, the fluid intake was increased.

Although there is usually little or no increased retention of urea in the blood, ammonium chlorid should not be used without examinations of the blood for urea and alkali reserve, as manifested in the carbon dioxid combining power.

The Intramuscular Injection of Magnesium Sulphate for the Control of Convulsions in Eclampsia. In the 38 cases upon which this paper by L. Dorsett[4] is based, he used the drug by injecting it deep into the gluteal muscle, and used it to the exclusion, practically, of all other forms of medication, such as morphin, veratrum viride, chloral, bromids, and luminal. None of these patients were bled, nor was a spinal puncture done.

The author began using a 50 per cent. sterile solution of magnesium sulphate, but changed to a 25 per cent. solution as he feared the toxic effect of the drug. He gives an initial dose of 15 c.c. in the buttocks, and does not fear to give this same amount every hour if necessary, but it is seldom necessary to give it at such short

(4) Am. J. Obst. & Gynec., February, 1926.

intervals. There has as yet been no respiratory disturbance of any kind, but he has been prepared at all times to give an injection of 1 c.c. of calcium chlorid intravenously, should the patient manifest any ill effects from the magnesium sulphate. Several of the cases have received as high as 100 c.c. of the drug within 20 hours without any perceptible reaction.

In the majority of cases there is a marked relaxation of all the voluntary muscles, while if the patient is in labor there is absolutely no effect upon the uterine contractions, nor has it any effect upon the blood pressure or pulse rate. While there is no purgative effect noticeable, it has a diuretic effect, as in numerous instances the patients passed large quantities of urine within 24 hours after the beginning of the injections.

Among the 38 cases treated, there were two maternal deaths; one patient died on the tenth day postpartum from a cerebral hemorrhage, having developed a hemiplegia the previous day. The second woman entered the author's service in deep coma, having had 14 convulsions before the treatment was commenced. Of the fetal deaths, there were 9; 4 babies were macerated, 4 were premature, weighing under 1300 gm., and died within 2 hours.

In a series of 38 consecutive cases herein reported there were 10 cases that had no convulsions after the first injection of magnesium sulphate. While the delivery of the patient has a very marked influence upon stopping the convulsions, the author is of the opinion that delivery under any circumstances should not be hastened, and the fact that 22 of the cases had no more convulsions after delivery does not mean that the delivery of the patient is the only method by which the convulsions can be eliminated.

[It is evident from the numerous reports that magnesium sulphate can be safely used in eclampsia (all forms) and that it helps to reduce the previously high mortality. We reduced the previously much higher mortality when

we gave up accouchement forcé in eclampsia. We are trusting nature more and more, and the conditions in which most pregnant women find themselves when complications arise are such that the accoucheur is wise if he gives nature a freer rein and keeps his own hands off. This does not mean that when the conditions are distinctly favorable the accoucheur may not try to improve on nature's methods. The Editor has used magnesium sulphate in combination with morphin, chloral and venesection, on 6 cases of eclampsia, all post-partum. One died.]

The Treatment of Eclampsia with Blood Serum from Eclamptics. The treatment of eclampsia is unsatisfactory as is evident from the high mortality. For a long time, J. J. McMahon[5] had in mind the possibility of using blood or blood serum obtained from recovered eclamptic patients for injection into acute cases. From November 23, 1924, to January 7, 1926, he used this serum in 10 cases. Eight were antepartum and 2 were postpartum eclamptics.

Three patients received the serum intravenously with no reaction, seemingly prompt improvement. All the others received the serum intramuscularly. The smallest dose was 40 c.c. of serum and largest dose, 160 c.c. The highest temperature was 106°. All the patients had some fever. Convulsions varied from 4 to 30. All the serum was given from Type II or IV.

One patient had six convulsions after the serum; three had two convulsions and two had one convulsion after the serum. Four had no convulsions after the serum. The albumin in the urine seemed to clear up very rapidly in four cases after the injection of serum. The author reports these cases because he was impressed by the unusually prompt and unexpectedly favorable reactions which followed the use of the serum in the majority of these cases.

(5) Am. J. Obst. & Gynec., August, 1926.

[If true eclampsia is an acute infectious process as many authorities believe, such treatment would have a serologic basis.—Ed.]

A Clinical Study of Nephritis in Cases of Pregnancy. In 1921 and 1922, 100 consecutive cases of renal damage occurring during pregnancy were chosen for study by R. Rockwood, R. D. Mussey, and N. M. Keith[6]. All patients were included who showed signs of hypertension, edema or renal injury during their present pregnancy, and all those with renal damage which was supposed to date back to a former pregnancy.

The authors have shown that the nephropathy of pregnancy and its sequelae can be classified clinically into the same groups as that of the ordinary type of nephritis. They have disregarded so-called true eclampsia, in which at necropsy pathological change is found only in the liver, if at all.

The more modern tendency seems to be to consider nephritis as a systemic disease rather than as one limited exclusively to the kidneys. No plausible explanation of the symptoms of edema and hypertension has been advanced when only pathological changes in the kidneys have been considered, but when extensive lesions of the smaller blood vessels, capillaries or general body tissues are postulated, these phenomena become much more understandable. The vascular changes can be demonstrated clinically in the small vessels of the eye and by direct capillaroscopy in the nail-fold.

A similar state of affairs apparently exists in the toxemias of pregnancy. Hinselmann has recently shown that in eclampsia capillaroscopy reveals capillary changes which gradually return to normal in the course of several months, but that if chronic nephritis develops, these changes are more marked and permanent.

The authors conclude that many of the toxemias of pregnancy are associated with nephritis and can be classified as are other types of nephritis, not necessarily

(6) Surg. Gynec. & Obst., March, 1926.

occurring in pregnancy. The classification of Volhard and Fahr was followed.

The course of 57 cases during pregnancy was followed, together with the fate of the mother and child over a period of three years. Both nephritis and toxemia of pregnancy seem to be general diseases affecting the cardiorenal vascular system as a whole. When the toxemias of pregnancy are classified by the same method which Volhard uses for nephritis, a marked difference in the end-results is seen and this difference allows the physician to make a more accurate prognosis, both as to the mortality among the mothers and as to the fate of the child in subsequent pregnancies.

The Mode of Infection in Pyelitis of Pregnancy. Fifty pregnant women were examined by means of the cystoscope and urethral catheter by L. Luchs[7]. Of these 50 women, 41 showed some disturbance in ureteral activity and in 21 of these the disturbance was bilateral. The right side was affected more than the left in most of these cases. Pyelograms confirmed the fact that dilatation of the ureters was present and the usual site for this dilatation was 10 to 13 cm. above the ureteral orifice into the bladder. The cause of this dilatation is not compression by the pregnant uterus but bends and kinks in the ureters. The author found that stasis of urine in the upper urinary tract during the last months of pregnancy is much more common than was formerly believed. Right sided ureteral dilatation was found in at least three-fourths of the cases whereas left-sided dilatation was found in only one-half the cases. The author demonstrated an insufficiency of the ostium in the presence of high grade ureteral dilatation and this he believes refutes the argument against ascending infection as the cause of pregnancy pyelitis. Hence, it is possible that pyelitis of pregnancy arises from an ascending infection. The author believes that ureteral catheterization is not only a harmless diagnostic procedure

(7) Arch. f. Gynäk., 1926, Vol. 127.

in pregnancy but also a therapeutic measure for ureteral pains. It may also be used for the release of urinary stasis in the ureters, thereby acting as a prophylactic against pyelitis.

Pyelographic Findings in Pyelitis Complicating Pregnancy. For the past year and a half J. T. Williams[8] has done routine cystoscopies and pyelographies on all suspected cases of pyelitis during pregnancy coming under his care at the Boston City Hospital.

An analysis of the author's findings gives striking emphasis to the idea of pyelitis during pregnancy being most frequently merely the lighting up of a preexisting process. The author is not prepared to deny that there are cases of pyelitis which develop for the first time during pregnancy. A few of his own cases seem to have been of this type, but the majority were undoubtedly instances of a chronic dilated kidney pelvis which with the additional strain of pregnancy and the additional urinary stasis caused by ureteral compression developed an acute exacerbation of pyelitis.

Further analysis of the pyelographic and clinical records of these cases reveals the fact that in eight patients the right side only was involved; in two, both kidneys, and in but one patient the left side only. This is in accordance with the clinical experience of others. Various reasons have been given for the preponderance of right-sided lesions. Among these may be mentioned the right lateral torsion of the uterus common in pregnancy, abnormal mobility of the right kidney, the fact that the fetus more commonly occupies the right oblique diameter of the pelvis, and finally the closer relationship of the ascending colon and its lymphatics to the right kidney. Pressure of the fetal head after engagement does cause displacement and undoubtedly compression of the urter. (Plates II and III.)

(8) Am. J. Obst. & Gynec., December, 1925.

[Compression or closure from kinking or tension? How often does an incarcerated pelvic fibroid compress the ureter and cause pyelitis, etc.?—Ed.]

The importance of the facts brought out by this study lie in a proper conception of pyelitis during pregnancy not as a condition due directly to the pregnancy but as, in the majority of cases at least, a chronic pre-existing condition brought to a state of acute activity by the pregnancy, and not to be dismissed without further consideration after the pregnancy has terminated. The mechanisms of the attacks of pyelitis during pregnancy appears to be as follows: A prolapsed kidney with dilated pelvis, with or without a kinked ureter; additional strain upon the excretory apparatus during pregnancy with later some ureteral compression by the fetal head; urinary stasis; infection with the Bacillus coli; recovery from acute symptoms after drainage is secured by ureteral catheterization or the end of the pregnancy; but persistence of the original conditions which predisposed to the acute attack leaving the way open to further trouble.

[The Editor would like to call attention to the fact that pyelitis can cause hyperemesis and eclampsia.]

A New Delivery Bed. The delivery bed presented by G. Gellhorn[9] possesses the following distinctive features: (1) The footrests which incase the entire foot are on a level with the bed. This means that the auxiliary musculature of the abdomen can come into play far better than if the heels are suspended from upright leg holders or if the legs are held by attendants. (2) Conveniently shaped knee supports prevent fatigue. (3) Washable straps around both ankles and knees effectually secure the legs in any desired position without excessive restraint. (4) Shoulder braces readily adjusted and well-padded with spongy rubber prevent the patient from moving her hips away from the edge of the bed. The patient thus lies throughout the second stage in a

(9) Am. J. Obst. & Gynec., August, 1926.

perfectly natural, comfortable and nonfatiguing position which she cannot change, even when only incompletely narcotized. (5) The absence of uncontrolled movement safeguards the disinfection of the external parts and the aseptic draperies are never disturbed. (6) The vulva remains exposed to view at all times. (7) The perineum is not overstretched hence deep lacerations are less likely to occur if the labor is conducted with sufficient obstetric skill. (8) An adjustable shelf beneath the buttocks provides a convenient resting place for the baby until the cord is severed and a receptacle

Figure 2.

for instruments should perineal repair be necessary. (9) Provision is made to raise the pelvis for the few occasions where this would be desired. (10) Strong trays firmly attached to the frame near the head end serve for all appliances of the narcotizer. (11) After narcosis is instituted, the hands of the patient may be secured in a leather sling. Fig. 2.)

[This is a very practical instrument. It is necessary to teach nurses how to care for women at their own homes in their own beds, since as yet, less than 40 per cent. of the women are confined in hospitals. Therefore

most maternities have delivery beds with less complicated accessories,—more like what a nurse will have to work with in her actual practice.—Ed.]

LABOR

General

The Principles of the Technic of the Second Stage of Labor. During the few hours comprising the second stage of labor, many babies and not a few mothers die, and many invalids, mostly permanent, are made. It is imperative, therefore, that the accoucheur be in personal attendance on the parturient or be represented by a competent assistant as soon as the cervix is completely dilated, that is, the second stage is begun; and that he remain by the patient's side until the labor is completed.

According to J. B. DeLee[1], the duties of the obstetrician during this critical period may be classed under five headings: (1) protecting the parturient from infection; (2) preventing injury; (3) relieving her of excessive pain; (4) preserving the life and health of the child; (5) preventing complications. While the average practitioner will obtain a certain meed of success in the routine treatment of the labor case, he will require more than the usual amount of brains and of skill to perform all these duties well and pilot the mother and baby safely through the perils which menace both from all sides. The accoucheur will therefore need to devote all his time and his talents to the mother and baby during this period of labor.

Protecting the parturient from infection consists not alone in carrying out in the minutest detail the prin-

(1) Surg. Gynec. & Obst., May, 1926.

ciples of asepsis and antisepsis but in so fortifying the woman's system that she can and will throw off any invading army of bacteria.

It should be and probably would be insulting to the reader if the author were to say that he must conduct a labor with the same painstaking regard for asepsis and antisepsis as that practiced by the surgeon in the surgical operating room. Vital statistics show that over 5,000 women die of puerperal infection every year in the United States. It is, therefore, needful to say that the parturient woman requires and deserves an even more perfect aseptic technic. Each labor should be conducted with the same care as that used in a vaginal hysterectomy. Obstetrical cases in general hospitals are especially apt to become infected and therefore need particular isolation, and isolation is permanently effectual only with architectural separation of the maternity from the general medical and surgical wards.

Fortifying the system against bacterial invasion involves the proper preparation of the gravida for her ordeal and the conduct of the long first stage of labor so as to avoid dehydration, starvation, acidosis, and nervous and physical exhaustion. It also means proper conduct of the delivery itself so as to prevent, first and most important, loss of blood, even minimal amounts; second, exhaustion from prolonged natural effort; third, shock, mental and physical; fourth, undue traumatism, natural and artificial.

The author cannot discuss all these important things in detail. By preparing the gravida he means that throughout pregnancy the woman should be made to exercise and to eat properly, she should be watched for focal and general infections, heart, kidney diseases, etc., and all such conditions corrected as far as possible—in short, adequate prenatal care should be given her. During labor, food, water, rest, and mental encouragement are to be provided. The second stage should not be allowed to drag on indefinitely but the watchful

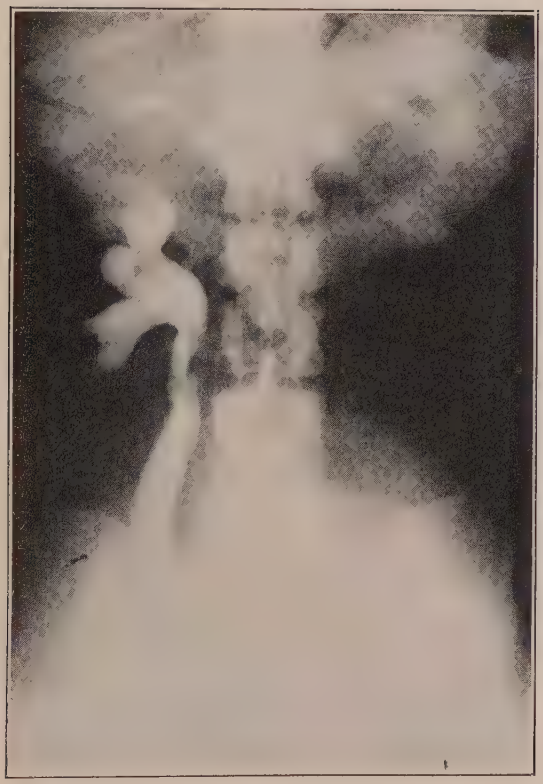
accoucheur should determine, "not what nature can endure but what she can accomplish."

Long before the first labor pain has occurred the attendant must have made up his mind whether or not the case is a normal one as far as mechanical disproportion is concerned. Prolonged pounding of the head against the inlet or the pelvic floor results in traumatism which invites infection, but improperly performed delivery by the accoucheur will cause more damage and give rise to more infection than natural delivery. Besides, an obstetrician who does not know how to operate usually also does not know how to be clean, that is, does not carry out a perfect aseptic technic. Unless, therefore, the attendant really can improve on nature he had better leave her alone, and interfere only in the presence of immediate danger to mother or child. In all necessary operations, traumatism of the tissues should be reduced to an insignificant minimum. Healthy tissues resist infection. Traumatized structures invite its entrance. The Latin motto which the old accoucheurs engraved on their forceps should be respected: *Non Vi —Sed Arte.*

There is a curious superstition that a patient can and should lose blood during labor, and that a bloodless labor, while not harmful, is abnormal. The author would prefer all labors to be bloodless, being certain that the women would have less postpartum infections, nurse their babies better, and recover their strength much quicker. It is wise, therefore, during the second stage to preserve the woman's blood reserve intact—she will always lose more than is good for her in the third stage.

Prevention of injury, in addition to its guarantee against infection, safeguards the woman's future health. The connective tissue and fascial supports of the cervix, bladder, vagina, rectum, and pelvic floor must be preserved or else the woman will suffer in later years from greater or less degrees of prolapse of the pelvic organs.

PLATE II.

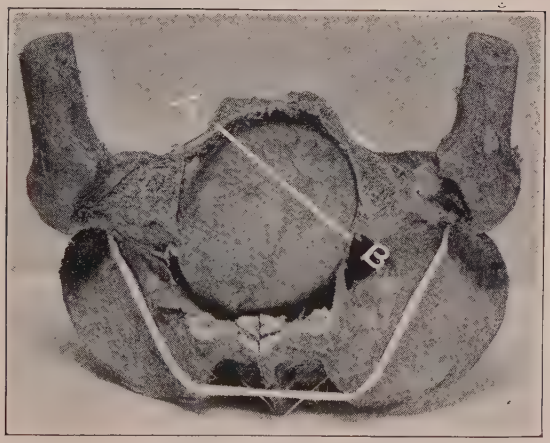


Three months' pregnant. Pyelogram of right side. Kidney pelvis and ureter greatly dilated.—Williams, page 113.

PLATE III.

Pyelogram of left side. Normal.—Williams, page 113.

PLATE IV.



The pelvis is sectioned through the ischial spines parallel with the plane of the superior strait, showing the normal relation here of the fetal head; *A-B*, ischial-ramic diameter; the position of the parietal eminence and of the left ischial spine should be noted.—Gardiner, page 124.

A certain amount of damage is inevitable during the passage of the child, especially in women of the enteroptotic type, those with a congenital weakness of all mesoblastic structures. In these women all we can save is the perineum, and not always that. Cervical tears, while common in operative deliveries, occur frequently in spontaneous labors, and the same applies with greater force in respect to the pelvic floor.

Reduction of such damage is effected by allowing the natural powers to bring the head down to and between the levator ani pillars. The bearing down efforts of the woman, instead of being spurred on by the attendant as is generally done, are to be restrained and moderated by instructing the parturient how best to use her powers, or by the judicious employment of anesthetics. Urging the parturient to "bear down" incontinently is too often an evidence of the attendant's desire to hurry the labor and curtail his expenditure of time, rather than an indication of the exigencies of the case. A slower dilatation of the parturient passage would be better for the soft parts and the baby's brain.

The obstetrician should understand the natural mechanism of labor and should closely observe its development by abdominal and rectal examination in each particular case. He should know how to direct the powers of labor to the best advantage by external measures, for instance, how to favor anterior rotation of the occiput, how to deliver the head and shoulders with their smallest diameters presented to the girdle of resistance. In short he must be an obstetrician, not a midwife "watching a hole."

One of the greatest crimes against the integrity of the pelvic connective tissues and the baby's brain and life, is the routine use of pituitrin to hasten the second stage of labor. DeLee is not sure that a parent could not recover damages at law if it were proved that a baby was lost, or the mother injured by her attendant administering pituitrin in an apparently normal labor.

A timely episiotomy will often save the perineum from more extensive damage and at the same time relieve the baby's head from injurious pressure, while in the hands of an expert obstetrician, protected by the ponderous aseptic technic of the special maternity, the forceps may occasionally be used to effect delivery with a minimum of danger to both mother and child. It will bear repetition, however, that those hands into which the majority of labors fall will do less damage to mothers and babies if they are kept off until nature shows some signs of being unable to bring the case to a happy conclusion.

The relief of pain during the second stage is one of the prime duties of the accoucheur. It is true that all anesthetics carry some degree of danger to both mother and baby, but on the whole the advantages outweigh this. The prevention of psychic shock is one of them, and the restraining of too powerful expulsive efforts is another. It was stated above that too rapid delivery is undesirable.

There are several claimants for favor in the field. Chloroform still has many advocates but obstetricians are giving it up one by one as cases of late poisoning develop in their practice. Nitrous oxid and oxygen are preferred by many who have not yet tried ethylene. Of the two gases the latter seems to be the more successful since it does not cause cyanosis, is more relaxing, leaves less headache, and does not cause any more bleeding. Its great inflammability is a drawback but this can be reduced to safety—almost—by using a water machine, zeppelin-painted, and by grounding the machine, patient, operator, and all who enter the room, to get rid of "static." For short deliveries in multiparae—for short operations not involving much cutting and suturing, ethylene may be used. The author's own preference is for ether, throughout the second stage and for perineal repair. Rarely one can use local anesthesia with ½ per cent. novocain.

The preservation of the life and health of the child, needless to say, is of importance secondary only to that of the mother. But it is needful to say that in the practice of most obstetricians both the life and the health of the child are not considered as requiring any special attention on their part. At least one must so decide upon observing the neglect the child suffers before he is born and the rough handling he gets while being brought into the world. Some men never listen to the baby's heart in the second stage and are astounded when it comes into the world dead. Others listen so infrequently that a child could die ten times between two auscultations. It is necessary, in order to detect the earliest signs of fetal distress, to listen to the heart every two to five minutes and in questionable cases, continuously. For this purpose the accoucheur will find the head stethoscope most convenient, indeed indispensable. When the fetal heart beats as low as 100 or less the child is in danger and needs to be removed, and this should be done if the conditions are right.

DeLee has seen men yank a child out of the womb with the gentleness of a coal-heaver, and expect the baby to live through the experience. A baby is a tender organism, particularly its brain, and it should be handled with great delicacy. We may, by ungentle manipulation, injure the brain and, while life is not affected, the child later may develop paralysis, paresis, mental disorder, or deficiency. Prolonged compression of the brain by the natural forces of labor will cause as great damage as imperfect operative delivery. This must be avoided by the help of art, appropriately timed. During the child's birth, its eyes, lungs, navel, intestinal canal must be securely protected against infection—not an easy task.

Preventing Complications. How few men conducting the second stage actually think of the most common possible complications! They cannot even be said to be "waiting for something to turn up" except the

exit of the baby. Abruptio placentae, rupture of the uterus, eclampsia, cardiac collapse, all occur occasionally during this period of labor and their remoteness or imminence should be promptly recognized. If the signs and symptoms of abruptio placentae suddenly appear, prompt extraction will save the child—and the mother too. Obstruction to delivery leading to rupture of the uterus is easily discovered but tumultuous pains can burst a uterus even when there is no mechanical obstruction. Then deep anesthesia will save the woman's life. Cardiac disease may show itself for the first time during the second stage of labor. Many cases of "obstetric shock" are really cardiopathies. A close watch of the parturient's heart, which is rendered so easy by the head stethoscope, would have warned the obstetrician in time.

The author concludes by quoting two very trite sayings, truer nowhere than in obstetrical practice and truest and most applicable to the second stage of labor: "It is always the unexpected that happens." "Eternal vigilance is the price of success."

A Signal Clock for Obstetricians. S. v. Wachenfeldt* constructed a portable clock which rings a little bell every 15 seconds by means of an electric mechanism connected with the second hand. He says, what we have appreciated for many years, that it is very difficult to count the fetal heart beat accurately by means of a watch held in the hand, especially after one becomes a little hyperopic. It is also difficult to keep up the asepsis of the delivery and watch the fetal heart accurately at the same time.

This clock of Dr. Wachenfeldt's can be set to strike every 15 seconds and all the physician has to do is count the beats between two rings of the bell.

[It is not always easy to hold one's watch in order to count the fetal heart beat. At the Chicago Lying-in Hospital we have clocks in the birthrooms which strike a tiny bell every 15 seconds. This is a great aid in

counting the beats. Vacheron and Constantin of Geneva, Switzerland, at the Editor's request, have put on the market a fine watch which strikes a tiny bell every 15 seconds. This watch with the head stethoscope make a combination that will save the lives of many babies.]

What Causes the Woman in Labor to Press Downward? When the fetal head is on the perineum patients press downward in an effort to expel the baby. However, O. Hoehne[2] points out that patients also press down when the fetal head is high up, when there is cephalo-pelvic disproportion and even in the presence of a transverse presentation where there is no pressure in the pelvis. All these indicate that bearing down efforts have a complex origin. An important component in this origin is the elongation of the lower uterine segment and anchoring of the uterus by the round and utero-sacral ligaments. The woman in labor attempts to prevent further elongation of the lower uterine segment and stretching of the ligaments, hence bearing down efforts are protective in nature. The correctness of this view can be proven by elevating the uterus cephalward with both hands. Even before there is complete dilatation the patient will press downward when this is done. The author is of the opinion that cervical lacerations which occur during spontaneous delivery are the result of premature bearing down efforts. In cases where the amount of cervical dilatation is hard to determine, a vaginal examination should be made when the patient begins to bear down in order to make certain that the cervix is completely dilated.

The Ischial-Ramic Diameter. The Origin of the Common Left Cervical Tear and Its Prevention. Near the end of the first stage of labor the presenting part is found in one of the oblique diameters, usually the right —a left occipito-anterior presentation. In this position the left parietal bone of the fetal head is in contact with the left ischial spine and the right parietal bone is in

(2) Zentralbl. f. Gynäk., Sep. 11, 1926.

contact with the inner surface of the descending and ascending rami of the pubis and ischium. In the usual presentation, the presenting part must be forced against the left ischial spine if there is any disproportion between the presenting part and this diameter.

The ischial-ramic diameter, from detailed pelvic measurements J. P. Gardiner[3] has found to average 9.5 cm., and the distance from the ischial spines to the subpubic ligament to average 8.5 cm., making an average difference of 1 cm. in the two measurements. In an individual pelvis the difference can be readily estimated with the examining finger by determining the depth of the contour of the inner surface of the rami of the pubis and of the ischium opposite the ischial spine.

The plane passed through the ischial spines parallel to the plane of the superior strait extends anteriorly to the rami of the pubes about 2 cm. below the subpubic ligament and posteriorly through the inferior part of the third sacral vertebra. The author has found by the examination of women in labor and by mensuration of the photographic cuts of sagittal sections of women who have died during the different stages of labor, that cervical dilatation takes place in the plane of the ischial spines.

Before complete cervical dilatation has taken place, any downward pressure or expulsive effort causing the presenting part to descend brings the cervix in contiguity with the left ischial spine, and if there is any disproportion in the ischial-ramic diameter, the cervix is caught between the spine and the bony head of the child. Pressure at the point of contact occurs and the damage to the cervix is proportionate to the amount of uterine tissue exposed and the degree of pressure exerted (any pressure necrosis may extend to the limits of the injury). In a left occipito-anterior presentation, the danger to the cervix is greater from the left than from the right ischial spine.

(3) J. A. M. A., Jan. 16, 1926.

Having observed the left lateral tear to be by far the most frequent of the cervical lacerations, as has been mentioned by Hart and other writers, and having found by postpartum examination these tears to be in juxtaposition with the left spine, the author is convinced that the cervical laceration is not caused by overstretching *per se* or by the asymmetrical position of the uterus, but by pinching of the incompletely dilated cervix between the fetal skull and the ischial spine.

The author concludes that the ischial-ramic diameter is an important pelvic diameter. The plane of cervical dilatation is in the same plane as that of the ischial spines. The most frequent left lateral uterine tear is due to a disproportion between the fetal head and the left ischial-ramic diameter. To prevent this tearing it is necessary to wait for full cervical dilatation; any interference during the first stage of labor is fraught with danger, unnecessarily predisposing it to the development of cancer. (Plate IV.)

Preparation of the External Genitalia for Delivery with Iodin-Alcohol: Report of 100 Cases so Treated, with Bacteriologic Results. It occurred to B. Lankford[4] that it might be worth while to prepare a number of cases with iodin-alcohol, and to note the results bacteriologically, as well as the morbidity. He had done this several years ago with encouraging results, but only in some 29 cases. Since last year he has added 100 cases, each of them prepared and delivered by himself.

The plan followed has been this: Nothing is done for the patient except a cleansing enema and a close clipping of the pubic and labial hair. After putting on a sterile gown and shortly before the woman is expected to deliver (some 15 or 20 minutes), two coats of 3.5 per cent. tincture of iodin (which is one-half the strength of the ordinary pharmacopeial tincture) are painted over the external genitalia, the inner sides of the thighs, in fact over all of the skin area that will not

(4) Am. J. Obst. & Gynec., February, 1926.

be covered by the sterile drapery. As soon as the iodin dries, it is removed or partially neutralized by the copious application of alcohol, for which purpose any of the ordinary alcohols will do. Shortly after the use of the alcohol, smears were taken from the greater and lesser labia, and from the skin area near the vulva; none was taken from directly over the anus, though that area was included in the preparation. The results were as follows: 9 positive cultures, the staphylococcus being found 7 times, colon and staphylococcus combined, 1, and colon 1. However, not one of these positive cases ran a febrile temperature, and only 3 of the 100 had a febrile temperature. Forceps was used 38 times. Lacerations of various degrees occurred in 72 cases.

To compare with this group of 100 cases, 100 others were analyzed that had been prepared by shaving and scrubbing with soap and water, and final use of bichlorid or lysol. Forceps were used 15 times, 43 were noted as lacerated, and 14 ran febrile temperatures. Thus though the forceps were used only one-third as often and though there were just a fraction over half as many lacerated, the incidence of morbidity was five times as great.

As far as the author is able to learn, mercurochrome has no advantage over tincture of iodin as a penetrating, effective skin antiseptic. It is quite true that mercurochrome is not irritating and iodin is. The patient should be at least partly under an anesthetic when the iodin is applied, so that if pain be complained of, a few inhalations will relieve her.

One may therefore conclude that we have in either the iodin-alcohol, or the 4 per cent. mercurochrome method of preparation of the genitalia for delivery, a procedure that is safer than any yet advanced; each is simple and can be used by any one who will take the trouble to have the solutions prepared shortly before expected delivery. The iodin-alcohol would seem to be the simpler of the two, as it can be used with effect

as late as five minutes before delivery, whereas, the use of mercurochrome is advised at least one hour before any operative procedure.

[At the Chicago Lying-in Hospital we have been using iodin instead of our former soap, water, lysol and bichlorid method, since February 1, 1926. Up to the present we cannot observe any difference in our results. On February 1, 1927, we will begin with 4 per cent. mercurochrome and try this for a whole year. It seems the great desideratum is not to get any alien bacteria into the vagina, and not to injure the local immunities too much.—Ed.]

Disinfection of the Vagina is Indispensable in All Gynecological as Well as Obstetrical Cases. D. v. Ott[5] believes that the vagina can be sterilized much more readily than the skin because the latter has sweat and sebaceous glands which makes disinfection impossible. In 430 cases of carcinoma of the uterus operated upon vaginally the author's mortality was 1.8 per cent. as compared with 8.9 per cent. of Schauta and a still higher mortality of Wertheim. This result the author attributes to preoperative disinfection of the vagina. The procedure employed is as follows: After the vulvar hairs are removed the external genitalia are scrubbed with brushes. The vagina is energetically rubbed with soap on the fingers and then irrigated with a 1-2000 solution of bichlorid of mercury to remove the mucus and soap. Finally the vagina and cervical canal are painted with iodin which produces a sterility of 100 per cent. In a series of 2000 abdominal and vaginal operations for fibroids where this technic was used there was not a single death. [! ! ?—Ed.]

Since instituting the above procedure in his obstetric practice the author has not had a single case of sepsis. In the last four years among 1,313 cases of abortion there was not a single death and not a single case of sepsis. The author insists that the vagina should be

(5) Monatschr. f. Geburtsh. u. Gynäk., September, 1925.

disinfected during every case of labor and before every gynecological operation.

The Protection of the Perineum. The purpose of this paper by A. Villarama[6], is to relate observations and studies made during the past five years on the protection of the perineum.

In the author's series, the methods of deliveries were as follows: spontaneous, 197; forceps, 51; breech extraction, 6; podalic version, 3; episiotomy, 2; hebosteotomy, 1; craniotomy, 1.

The author has found that very strong pressure against the advancing head is a disadvantage. The important point is merely to give proper support to the perineum in such a way that the tension and distention of the perineum become more evenly distributed. To do this it is of prime importance not to use force or pressure which is greater than that of the descending head, or inevitably the section of the perineum between the head and the hand will be crushed and must tear. Following this line of reasoning, the author has allowed the head to dilate the perineum gradually and when the parietal bones are in sight, a few drops of anesthetic are given during the acme of the contraction at the same time care being taken to have the entire vaginal orifice dilate slowly by gently pushing back its edges over the head. It is necessary to delay expulsion for at least 10 minutes to obtain an intact perineum.

An analysis of the author's spontaneous deliveries shows: Total number of cases, 197; lacerated, second degree, 35; lacerated, first degree, 16; no laceration, 146; fetal death, 2. Almost 70 per cent. of his cases were delivered without laceration.

The breech extraction and podalic version cases were all primiparae. Of the 9 cases, 2 had a second degree laceration, 4 first degree and 3 remained without any laceration.

(6) Am. J. Obst. & Gynec., June, 1926.

During the last 2 years, the author has learned that application of a low forceps offers the best means of delivery for a primipara. It not only enables us to protect better the perineum but also to shorten and lessen the pains of the second stage. By putting the patient under complete anesthesia we cause all tissues to relax and we can make slow tractions.

Of the 51 cases of forceps extraction, 6 sustained a second degree and 10 a first degree tear; the rest, 35 did not have any laceration. There was no fetal death among them. All tears were properly sutured and found well coaptated after healing.

The Pelvic Floor and Parturition. The following advice is given by R. H. Paramore[7]: Avoid undue straining by the patient during delivery; see that a conical rather than an obtuse part of the head presents at the aperture, and that the superficial parts do not too much resist the birth. Prevent extension of the head all you can; limit the duration of the process within reason; and always, if possible, give an anesthetic. The idea that woman is born to pain, that she was created to bear it, and that man, therefore, should not prevent it,—an idea that once obtained—is a fetish one, which, if not dead, should be killed. A gentle and easy delivery without pain, a delivery in which the levators are little or not at all contracted, is the ideal. It is ideal, not because woman, at the supreme act of her being is seen through this momentous time without pain, but because in this way to a very large extent she is rendered invulnerable to an important injury, so that subsequently she can minister to the needs of her house with the same strength and happiness as formerly. This not only means something for the house, it means something for the State, and it is a matter with which every obstetrician and every general practitioner should be thoroughly familiar.

(7) J. Obst. & Gynec. Brit. Emp., 1926, Vol. 33, No. 2.

[Both of the last two papers contain wholesome advice.—Ed.]

Outlet Pelvimetry and Its Importance. The normal female pelvic outlet may be considered a true rhomboid whose transverse and anteroposterior diameters are 11 and 11.5 cm. respectively. For practical purposes it is composed of 2 triangles, an anterior or urogenital and a posterior or rectal. These triangles have a common base, the bisichial or transverse line joining the ischial tuberosities. The apex of the anterior is formed by the lower edge of the symphysis while that of the posterior is formed by an equally rigid, fixed point, the tip of the sacrum. The boundaries of the two triangles differ chiefly in that the legs of the anterior are composed of rigid nonyielding bony barriers, the descending and ascending rami of the pubis and ischia, while the legs of the posterior are composed of the soft, yielding parts, mainly the levator ani, coccygeus, the superior and inferior pelvic fasciae, and less immediately the great and small sacrosciatic ligaments.

The diameters of the outlet commonly taken are the transverse, the anteroposterior, the anterior sagittal, and posterior sagittal. It is also customary to note the angle of the pubic rami as narrow, broad, or normal by outlining the rami with the fingers or thumbs.

There are, however, according to C. O. McCormick[8], but two practical diameters, the transverse or bisischial and the posterior sagittal.

The technic of taking these diameters is as follows: The patient is placed in the exaggerated lithotomy position with the hips well over the edge of the table. This position greatly facilitates measurements because it forces the ischial tuberosities into prominence and is little short of imperative in order to obtain accurately the posterior sagittal. The patient having been placed in this position the ischial tuberosities are carefully palpated with the thumbs at the widest transverse diameter.

(8) Am. J. Obst. & Gynec., June, 1926.

This line will be found to pass transversely across the anterior border of the anus.

The examiner can conveniently perform the measurement by employing a special outlet pelvimeter, such as designed by Williams or DeLee. He may still more simply perform this maneuver by using an ordinary linen or steel tape stretched against the tuberosities over the thumb ends. And what is still a more ready, though inaccurate, yet practical method in noting lateral contraction is passing the fist transversely between the ischial tuberosities. The average fist is 8 cm. wide and if it can be comfortably passed the average head will come through.

The measuring of the posterior sagittal is much less simple, largely because its extremities are decidedly less accessible. The anterior extremity is centrally located on the fixed transverse interischial diameter, while the posterior is represented by the tip of the sacrum. The latter is rather difficult to demonstrate unless the patient's hips are well over the end of the table and the thighs well flexed. With the index finger in the vagina the thumb is placed over the region of the coccyx. By moving the coccyx back and forth, the sacrococcygeal joint is determined and indicated by marking on the skin with a blue pencil.

There seems to be a sufficiently constant relation between the distance between the superior posterior iliac spines, ordinarily known as the transverse diameter of the rhomboid of Michaelis, and the transverse of the outlet to give this relation some practical value. A narrow rhomboid of Michaelis is very indicative of a narrow outlet, and a routine prenatal examination should include inspection of this rhomboid. Because in addition, the length of this rhomboid seems to have a definite relation to the conjugata vera—a short rhomboid foretelling a contracted inlet.

Outlet pelvimetry allows us to recognize the most common pelvic deformity in the American white

woman, namely, the contracted outlet pelvis, commonly known as the funnel pelvis. Of all the pelvic deformities in the white woman, it constitutes 44 per cent.

This deformity, where outlet pelvimetry is not employed as a routine, is especially liable to be noted in that form of funnel pelvis known as the muscular type, which has been given considerable consideration in recent obstetric literature.

In contracted outlet the transverse diameter is 8 cm. or less, the arch thus being of the male rather than the female type. In general, if the transverse is over 8 cm. no further measurement of the outlet need be taken. However, if it is 8 cm. or less, it is important to measure the posterior sagittal. The normal posterior sagittal diameter is 7.5 cm.

If pelvimetry shows a contracted outlet and the baby is of average size, an episiotomy is indicated, when delivery is to be conducted from below. Not only is an episiotomy indicated, but the type suggested; namely, the mesiolateral instead of the median.

[This is a very timely paper as it points out the cause of many cases of dystocia in American women. The type of parturient presenting a contracted outlet is usually the hypopituitary or infantile, or dyspituitary or masculine. More attention should be paid to constitutional abnormalities as the cause of dystocia. The Editor has pointed this out for many years, and has made brief reference to it in his book on Obstetrics, under the title "Dystrophia Dystocia Syndrome." D. A. Horner drew attention to this type of difficult labor, A. B. Davis of New York mentions it in a paper on extraperitoneal cesarean section, and it would be well for students of contracted pelvis to devote time to the general body stigmata as well as to the local. Anomalies of the uterine action, eclamptic states, abnormal consistency of the soft parts, etc., are also part of the clinical picture of the Dystrophia Dystocia Syndrome.]

The Course of the First Labor in Advanced Age. Nearly all authors who have studied this question come to the conclusion that there is more danger to mother and child among older women than among younger ones. But age alone is not responsible for this. Other factors play a part, notably the constitution of the individual.

Among aged primiparas there are two groups, namely, those who conceive late for extraneous reasons and those who cannot become pregnant earlier for constitutional reasons. In the latter group the cause may be defective ovarian function or hypoplasia of the genitalia.

K. Jaroschka[9] studied 711 primiparas over 27 years of age and 1,804 primiparas under that age. The incidence of contracted pelves among the older women was 8.3 per cent., as compared with 5.2 per cent. for the younger ones. This indicates a diminished body development in general, with special under-development of the genitalia.

With increase in age there was an increase in the incidence of premature rupture of the membranes. Deficient uterine contractions occurred three times more often among the older women and a hypoplastic cervix often gave trouble among the older women. A sluggish bladder and bowel often occurred with sluggish uterine pains. The former are not the cause of the latter, but all three have a common origin, namely a change in the vagus tonicity.

Among the women under 27 years of age, spontaneous delivery occurred in 87 per cent. as compared with 73.7 per cent. for the older women. The duration of labor was not longer among the latter but disturbances of the third stage occurred more often. More of the older women suffered lacerations but eclampsia did not occur more often.

[It did in my cases.—Ed.]

(9) Med. klin., Mar. 19, 1926.

The children of the older women were as a rule heavier than the others. With increase in maternal age the incidence of operative delivery increased and also the fetal mortality. In conclusion the author agrees with Kermauner who says that it matters not whether a patient is old or not at the time of the first labor. The bad prognosis of advanced age is due essentially to the under-development of the genitalia. The hypoplasia prevents early conception and after conception does take place it causes dystocia and increases the danger to mother and child. There are two distinct types of women with hypoplasia. One is adipose and the other is asthenic and gracile.

[The Editor cannot see how the presentation here can justify the conclusion that "it matters not whether a patient is old or not at the time of her first labor." It is not the years but the conditions co-incidental, that make trouble. The Editor has had "precipitate labors" in women over forty, but the opposite is the rule. While the accoucheur should always encourage the woman having her first baby late in life—still he must be prepared for dry labors, occiput posteriors, weak pains, cervical and perineal dystocia, etc., etc., and a slightly larger percentage of dead babies.]

Does the Child Help Itself During Labor? In ancient times the accepted belief was that when the fetus was mature it initiated and completed labor through its own activity. During the last century there was a reaction and no mention at all was made of the self-help of the fetus during labor. However, while we do not believe that the child braces itself against the uterus and delivers itself, H. Küstner[1] emphasizes that we should not maintain the child does not help at all. Sellheim is of the opinion that the child does help in its own delivery. This assistance consists in reflex attempts to accommodate itself to the birth canal during delivery according to the law of least resistance. Movement of the child

(1) Monatschr. f. Geburtsh. u. Gynäk., October, 1925.

may occasionally be seen in the interval between pains when the head remains in the vulva for a long time. The same condition may at times be felt on internal examination. There are essentially two types of movement of the child and these are stretching and rotation.

The Damage of the Lower Uterine Segment in Spontaneous Deliveries Based Upon Systemic Colposcopic Examination in the Puerperium. H. Hinselmann[2] examined the vaginas of a large number of patients during the puerperium to see the damage labor had produced. Nearly all the injuries were in the cervix and in the introitus. Isolated lacerations in the vagina were rare and most of them were in the middle third of the vagina on the left side. A frequent finding was injury to the vestibule, especially in the region around the urethra and clitoris and these were in the form of bruises. They were most likely due to the strong pressure of the fetal head as it passed through the outlet. Forced protection of the perineum greatly increased these injuries.

Lacerations of the cervix were not very common. The tears were often multiple and were usually one-half to one centimeter long. Most of them looked clean. A not uncommon bruise was found in the anterior lip of the cervix about one-half to one cm. above the external os. The author believes that all puerpera who do not have fresh repairs should have a vaginal examination with a colposcope.

Obstetrical Heresies at the Brooklyn Hospital. W. Smith[3] briefly reviews 2,000 consecutive ward and private case histories, covering a period from January 1, 1923, to April 8, 1925. He considers posterior positions of the occiput, forceps delivery, and perineal damage in primiparae, and discusses the management of the third stage of labor in all cases, cesarean sections, maternal and fetal mortality, and puerperal morbidity relative to manual rotations and perineal incisions.

(2) Monatschr. f. Geburtsh. u. Gynäk., January, 1926.
(3) Am. J. Obst. & Gynec., March, 1926.

If, after a patient has been in labor twelve hours, she does not then show signs of termination, a careful vaginal examination is made to determine if her labor is progressing satisfactorily, and to obtain all possible information relative to it, and its probable termination. If there is a posterior position of the occiput, one considers whether this particular patient will or will not go on to a spontaneous delivery.

If it is decided that the baby probably will not rotate spontaneously and that the patient probably will come to a forceps delivery, it is felt that the patient and the baby will be better off if the posterior position of the occiput is changed to an anterior position. As soon as the cervix is dilated sufficiently to admit the operator's hand, the patient is deeply anesthetized with ether and, with the gloved hand and arm within the uterus, the vertex is raised above the brim, and the head manually rotated through an arc of 180° to the opposite occipito-anterior position. If, some hours later, the patient goes on to a spontaneous delivery, well and good; if she goes to an instrumental delivery, there is an easy application of forceps.

The author frequently finds retraction rings. He finds them because he often places his gloved hand within the uterus during labor. They are generally found in posterior positions of the occiput with scant liquor amnii. Lack of simultaneous descent of the fetus and retraction of the uterus seem to predispose to the formation of these rings. In a group of 24 cases, all the rings were around the child's neck.

The author uses the term *Forceps Control*, which is the application of forceps to the vertex after it has appeared at the vulva, and the patient has given every indication that she will deliver herself spontaneously in a short time, but with laceration. He uses forceps for purposes of control after incisions of the perineum, and he finds that, by this means he can control the vertex

more surely and with less damage than by the manual method.

The author hesitates to cut a perineum which is stretching well and which gives no evidence of lacerating. Therefore, only two-thirds of the primiparous perineums were incised. He is not greatly concerned if a thoroughly stretched sphincter muscle is lacerated or cut, because, as the ends of the dilated muscle do not retract, the repair is easy and the functional result is uniformly good.

The author believes that it is unnecessary and dangerous to pack the uterine cavity. In cases of placenta previa, he expresses or removes the placenta at once, packs the vagina full of zinc oxid gauze, and puts on a tight abdominal binder. Thirteen cesarean sections were performed (1.55 per cent.). The total number of maternal deaths in the 2,000 cases was 13 (.065 per cent.).

Out of the 2,000 consecutive cases of labor there were 134 babies still-born or who died in the hospital before the mother was discharged (6.7 per cent.). Fifty-eight of these babies were premature, weighing between 1 and 5 pounds. There remains a group of 76 fetal deaths in babies weighing over 5 pounds or a chargeable fetal mortality of 3.8 per cent. In these 2,000 cases the maneuver of manually rotating the child through an arc of 180° was executed 82 times. Ten babies died from labors in which this procedure was practiced.

Fetal death was not due in any of these cases to prolapsed cord or to interference with the placenta. Death was due in 5 cases to intracranial hemorrhage as proved by autopsy, in 4 cases probably to the long, hard labor, and very probably to brain trauma, and the tenth baby died because the cord was tight around the neck at delivery.

The author's conclusions are as follows: Manual intra-uterine rotation of the fetus in selected cases, whereby the position is changed from an occipitoposterior to an occipitoanterior through an arc of 180° does no

harm to the mother and but rarely jeopardizes the child. It is of great benefit to mother and child because of the shortening of labor and because of the diminution of trauma when the labor is terminated. Conservative vaginal delivery, rather than a too frequent resort to cesarean sections, justifies the occasional loss of a baby in young primiparae. If a patient is delivered under deep anesthesia, the principle of expressing the placenta at the first uterine contraction and keeping the uterus empty, thereafter, is essential in the prevention of postpartum hemorrhage. It is not in evidence that incisions of the perineum or manual rotations of the fetus in utero are a major causative factor in producing puerperal morbidity.

[There is little very heretical in this paper. Changing persistent occiput posteriors by rotation of the body as part of a two stage delivery is old practice. The use of the forceps to control the too rapid exist of the head was practiced thirty years ago, and still is—but modified a little,—i.e. by stopping the expulsive efforts of nature and using a moderate degree of artificial force for extraction. The holding of laceration of the sphincter ani lightly is heretical and the Editor cannot subscribe to it.]

Analgesia and Anesthesia

The Theoretical Basis for Synergistic Narcosis and Its Practical Significance. Labor was made painless by the Gwathmey synergistic method in 95 per cent. of the cases studied by E. Vogt[4]. As contraindications to this method the following are mentioned: diabetes, eclampsia, pregnancy icterus, respiratory diseases, diseases of the liver and kidneys, circulatory disturbances, inflammatory changes in the large intestine, and incontinence of feces. The narcosis is indicated in cases where labor is progressing normally and where spontaneous

(4) Zentralbl. f. Gynäk., Jan. 9, 1926.

delivery is expected. The narcosis usually lasts about four hours and is usually begun in primiparas when the cervix is dilated 4 to 5 cm. and in multiparas when two fingers can pass the cervical canal. A painless labor until the head passes through the cervix can be assured in nearly every case. Protection of the perineum is made easier. No evil effects of this form of narcosis were noticed by the author. If weak pains set in after administration of the drugs, small doses of pituitary preparations will again stimulate the contractions. This method requires careful medical supervision and is therefore not to be used in general practice or in the home.

Pantopon-Scopolamin Seminarcosis in Labor. P. J. Carter[5] has reviewed some 200 articles on this subject and finds them practically unanimous in their agreement on this point, that scopolamin-morphin is a perfect first stage anesthetic, in that it restrains rather than overworks the system by eliminating pain and physical and nervous exhaustion.

Many have condemned this method because of the effect morphin is supposed to have on the child, yet they will willingly employ other methods which call for the use of the same drug. Morphin does affect the child if used in large doses immediately before delivery, but it has no effect if given under the proper technic in scopolamin-morphin anesthesia. Carter's objection to it is on the mother's account, not the child's, as he found in several instances that it produced severe headaches, nausea, and vomiting. For this reason he has substituted for it pantopon, which combines the special advantage of opium and morphin without the disadvantages incidental to each. These drugs should always be given in a hospital with a special nurse in attendance.

The author uses pantopon, gr. ⅓, with scopolamin, gr. 1/100, for the initial dose. A second dose of scopolamin alone is given from 45 to 60 minutes later, the same amount, gr. 1/100, which is the standard dosage for the

(5) Am. J. Obst. & Gynec., November, 1925.

average case. Succeeding doses are from, gr. 1/200, to gr. 1/400, the time and amount depending upon individual susceptibility and the progress of the labor.

In 21 cases delivered in New Orleans under his personal supervision the results have been most encouraging. Eighteen were perfectly successful and the three failures were anticipated for the reason that labor was far advanced when the drugs were administered and in each instance delivery occurred within an hour after the first dose. There was one fetal death; autopsy showed extensive hemorrhages into the brain; the labor had lasted less than three hours. There were no blue babies.

Twilight Sleep (Siegel Method) in Obstetrics. In Fuchs'[6] clinic morphin and scopolamin have been given before all major operations for the past twenty years (in about 4,000 cases) without a single death or toxemic symptom. The same drugs were also given to 135 obstetric patients. As contraindications to twilight sleep the author considers maternal resistance to scopolamin, unusual sensitiveness to scopolamin, primary atony of the uterus or irregular pains, cephalopelvic disproportion, faint heart tones, premature labor and syphilis.

In the author's series the babies were entirely normal in 71 per cent. of the cases, oligopneic in 18 per cent., apnoeic in 6 per cent., and apnoeic and asphyxiated in 3.7 per cent. Such good results the author says are possible only if the fetal heart tones are carefully controlled. There was one fetal death. Complete anamnesia was obtained in 75.5 per cent., partial in 20.6 per cent., and no anamnesia in 3.8 per cent. Four patients had outspoken maniacal symptoms. The author emphasizes that twilight sleep should be used in a hospital only.

[For over thirty years morphin has been used during the first stage and its dangers are known. When scopolamin is added to it the dangers are doubled, and Mayer says that in Europe the mortality of the babies due to twilight sleep has not been less than 1 per cent.

(6) Monatschr. f. Geburtsh. u. Gynäk., October, 1925.

This is too high a price. The Editor uses morphin and magnesium sulphate in the ordinary first stage, and takes care not to give the narcotic if the delivery is expected within three hours. We use Gwathmey's method in selected cases. Usually we can dispense with the rectal instillation.]

Uterine Anesthesia in Obstetrics and Gynecology by Injecting the Frankenhaüser Ganglia. E. Febres[7] has used the following method of anesthetizing the uterus through the vagina since 1907: About 25 to 30 c.c. of 1:100 novocain-adrenalin solution are injected into the cervical plexus. The needle is passed along the vaginal wall lateral and posterior to the cervix about 2½ to 3 cm. from the external orifice. One must in addition infiltrate the second, third and fourth sacral nerves which do not enter the cervical plexus but reach the uterus directly. To do this one must pull the cervix way down towards the vulva. In some cases it is necessay also to inject the posterior surface of the uterus and the adnexa. After the injections are made the uterus and vagina are lightly massaged. Two or three minutes later one may operate. The author says that this form of anesthesia has always been successful.

The Use of Ethylene in Obstetrics. In reviewing 85 cases in which J. Kreiselman and H. F. Kane[8] employed ethylene as an anesthetic, they found that 33 were delivered spontaneously, 23 by low forceps, 9 by mid forceps, 6 by podalic version, and 14 by cesarean section. One of the cesarean sections was of the low, or cervical type, and one of the versions was in a case of twins—a double version.

Practically all of the primiparae and many of the multiparae had received during the first stage, from 1 to 3 hypodermic injections of morphin sulphate gr. ¼ in 2 c.c. of a 50 per cent. solution of magnesium sulphate. In several cases the hypodermic seemed to have little or no effect, so the rectal injection of quinin,

(7) Bull. de la Soc. d'obstét. et de gynec., December, 1925.
(8) Surg. Gynec. & Obst., September, 1926.

ether, alcohol and olive oil as suggested by Gwathmey, was employed. This preliminary narcotization seemed to increase the efficacy of the ethylene.

In the first half-dozen cases administration of the gas was not started until the second stage of labor had been definitely reached. Subsequently, it was begun if possible, just before the cervix became completely dilated. It was found that the full analgesic effect of the gas was not obtained during the first few pains. By beginning to give the anesthetic earlier, the contractions could be rendered painless by the time the patient was in the second stage.

The duration of the second stage seemed to be lessened. With the abolition of pain, the patient would use her voluntary expulsive powers throughout the entire period of uterine contraction. Unless the progress of the head was continuous, the perineal portion of the second stage was frequently shortened by delivery with low forceps after perineotomy.

No harmful effects on the child were noted. On the contrary the promptness with which these babies breathed and cried with noticeable.

Ethylene seems to be almost an ideal anesthetic for abdominal deliveries. The rapidity with which anesthesia is induced, the satisfactory muscular relaxation, the absence of ill effects on the fetus, the promptness with which the patients regain consciousness, and the freedom from lingering after-effects form a combination of qualities which can be equaled by no other anesthetic. In performing the six versions, uterine relaxation was as complete as could be wished.

Complete analgesia was obtained in 84 per cent. of the cases, appreciable relief from pain in 13 per cent. and failure in 3 per cent.

[The Editor uses ethylene in obstetric cases, but finds that it causes slightly more oozing than ether.]

Delayed Chloroform Poisoning Following Delivery. Well aware of the dangers of chloroform in pro-

longed anesthesia and in patients who are not suitable operative risks, G. D. Royston's[9] use of chloroform during labor is limited to that period in which the actual delivery takes place, which is usually no longer than 5 to 15 minutes and a comparatively small amount is used. After the delivery of the child the anesthetic is usually changed to ether or nitrous oxid. No extensive repair work is carried out under chloroform anesthesia. On account of the damaging effect of the prolonged use of chloroform upon the liver it is, of course, not used in cases of late toxemia of pregnancy, or in labor unduly prolonged and during which time the patient has received only a small amount of nourishment or fluids. If chloroform is used with these restrictions, its dangers in obstetrical practice are reduced to an almost negligible minimum and its advantages stand out prominently. It is a well-known fact that the dangers incident to chloroform are markedly reduced at the time of labor but not during the puerperium, when chloroform is quite as dangerous as at other times. Exactly why this should be the case has not yet been definitely settled, but it is nevertheless a fact which has been established beyond doubt.

Delayed chloroform poisoning presents a clinical picture which is quite characteristic and which is briefly as follows: The patient may have nausea and vomiting following anesthesia or she may remain in apparently good condition for a day or two after delivery, when jaundice, with or without nausea and vomiting, develops and she passes into a torpid state, with occasional periods of excitement, and becomes comatose. This coma and jaundice may terminate fatally about the fourth or fifth day. However, if proper treatment is instituted, as a result of rapid repair of the liver, this picture may in the course of 2 or 3 days after deepest coma, return to normal.

(9) Am. J. Obst. & Gynec., December, 1925.

An analysis of three cases of chloroform poisoning reported by Royston shows that all had long exhausting labors lasting over a period of several days and during this time comparatively little food was taken, thus fulfilling the experimental requirements for liver injury which left these patients peculiarly susceptible to chloroform poisoning. In two cases a reduction in the size of the liver, as outlined by percussion, was definitely present. The starvation, dehydration and general state of exhaustion were all contributing factors. The fairly constant time for the appearance of symptoms of toxemia, first becoming evident two days after delivery also represents a typical picture similar to that obtained in chloroform poisoning in animal experiments.

In two cases bacterial organisms were demonstrated; in one in uterine and in the other in blood cultures, which infections render such patients more susceptible to chloroform poisoning.

In view of these results and especially because of the work of Graham and Opie and Alford, the following conclusions are reached: While the author still feels that chloroform is a safe anesthetic in obstetrics, there are cases such as those reported in the paper, in which it is highly toxic and may be the direct cause of death. These cases satisfy all the conditions necessary for the production of chloroform poisoning in experimental animals; namely, starvation and depletion of the glycogen stored in the liver, due to lack of food taken during period of labor plus the utilization of the reserve by the physical exertion of a prolonged labor. We should guard against the production of these conditions by supplying the patient with carbohydrates, and when they are present, chloroform should not be used, ether or nitrous oxid being the anesthetic of choice in such cases. If in spite of these precautions, we have a case of chloroform poisoning or any other condition associated with liver necrosis, we should give carbo-

hydrates and alkalies, preferably glucose intravenously, to allow the liver to recuperate more readily.

[Ethylene is an excellent anesthetic for toxemic cases.—Ed.]

Complications

Atypical Rupture of the Uterus with Special Consideration of Hoehn's Sign. H. Heidler[1], in 1924 reported a case of atypical rupture of the uterus and maintained at that time that in cases of rupture of the uterus contractions ceased entirely only when the fetus has escaped into the abdominal cavity. When the fetus in spite of the rupture remains within the uterus and the presenting part stays in the pelvis uterine contractions may be present. Another case supporting the latter contention is reported in the present communication. The author believes that even a ruptured uterus can expel a fetus through the natural passages.

In Stoeckel's book is found the statement that the sudden change from stormy pains to absolute cessation is conclusive evidence of rupture of the uterus, but Heidler reports a case where pains suddenly and completely ceased in which no rupture of the uterus was present. Hoehne maintains that a ruptured uterus cannot contract after an intravenous injection of pituitrin but Heidler describes a case where a ruptured uterus did contract after intravenous injection of pituitrin. Shock in cases of rupture of the uterus occurs only when the fetus is free in the abdominal cavity and not when the child is still within the uterus. Shock is absent if the rupture takes place during narcosis.

[Neither statement is in harmony with the Editor's experience.]

(1) Monatschr. f. Geburtsh. u. Gynäk., October, 1925.

Summarizing his study Heidler concludes that the symptomatology of rupture of the uterus is not always typical. There are all stages from almost complete absence of symptoms to the case with typical symptoms. Uterine contractions may be present or absent. The Hoehne test (intravenous injection of pituitrin) is useful to differentiate between a rupture of the uterus and a diverticular pregnancy, a rare occurrence. Of seven patients with complete rupture of the uterus who were operated upon during the last few years six survived.

Rupture of the Uterus During Pregnancy. According to J. Riddell[2], rupture of the uterus before the onset of labor is more common in multiparae than in primigravidae and previous injury and infection of the uterus are the chief predisposing causes. The uterus is frequently thinned out and shows signs of chronic metritis. Slight forms of indirect violence often act as the exciting cause of rupture and rupture is confined to the upper part of the uterus.

Diagnosis depends on recognizing the "acute abdomen," associated with signs of internal hemorrhage, the whole condition being graver than that of a ruptured extra-uterine pregnancy. Prognosis as regards the mother is good in cases of early operation. In 20 years the operative mortality has been reduced from 40 per cent. to 16 per cent. in the performance of laparotomy. Treatment consists in laparotomy usually with hysterectomy. Occasionally it may be justifiable to suture the rent in the uterine wall.

Injury of the uterine wall, associated with sepsis and followed by chronic metritis, may be the cause of rupture of the uterus at a subsequent pregnancy. Perforation of the wall by a curet, even though the wound heals without untoward signs, is not so harmless an accident as it may appear. Manual removal of the placenta with damage of the wall stands in the same

(2) J. Obst. & Gynec. Brit. Emp., 1926, Vol. 33, No. 1.

relation. Any scar in the uterine wall is a potential danger, particularly when weakened even by mild sepsis. Prophylaxis is obvious. Intra-uterine manipulations, whether instrumental or manual, call for the exercise of the greatest skill and care particularly in the case of the puerperal uterus.

Rupture of the Uterus Following the Administration of Pituitary Extract. Rupture of the uterus following the administration of pituitary extract was brought to the attention of J. G. Sherrill[3] by two cases.

The more interesting features of one case are: (1) the history of profuse bleeding and marked syncope which are important signs of rupture but they had failed to excite the suspicion of this accident either on the part of the obstetrician at the time or the author subsequently; (2) the absence of peritonitis as a result of the injury, even in the presence of infection sufficient to produce violent systemic reaction; and (3) the failure to obtain a culture of organisms from the blood. The fourth point of importance appears in the recovery of this patient after the long delay during which expectant methods were employed before the radical hysterectomy was performed. The fact that she had received pituitrin during labor must be considered as one at least of the determining causes of rupture. It is perhaps the chief causative factor in this case.

The second case also shows that sudden collapse during the progress or at the completion of labor is of great diagnostic value and should at once suggest its occurrence. Uncontrollable hemorrhage after the delivery of the child and placenta should cause one to suspect rupture of the uterus, either partial or complete. Inspection of the source of the hemorrhage should clear up the diagnosis.

[The actual number of ruptures of the uterus caused by pituitrin can never be known. They are either not recognized or not reported. It is reasonable to expect

(3) Surg. Gynec. & Obst., May, 1926.

that since, of late, pituitary preparations are being standardized, and more accurate dosage rendered possible, the evil effects of this drug, so common in the first years after its discovery, will gradually disappear. Further, a clearer knowledge of its potencies for good as well as harm will enable the accoucheur to better place the indications for its use. With all our care, however, sometimes this drug will act with destructive force, and therefore one must use it only in its most proper indication and with the greatest of circumspection.—Ed.]

Spontaneous Rupture of the Uterus in Labor Following Sturmdorf Tracheloplasty. The present instance of rupture of the uterus subsequent to Sturmdorf tracheloplasty is, as far as N. J. Eastman[4] could determine, the first of its kind to be recorded.

The case presents several notable features: Rupture occurred after less than eleven hours of labor. The patient was from two to three weeks pregnant when the tracheloplasty was done. Because of certain circumstances, this coincidence was unavoidable. It is striking, however, that the operative trauma, including a dilatation to No. 10 Hegar dilator, did not precipitate abortion. It would also have been thought that the physiologic softening which the pregnant cervix undergoes would have hindered postoperative fibrosis sufficiently to prevent the intense cicatricial rigidity present in labor.

Convalescence following the hysterectomy was surprisingly smooth attesting the favorable prognosis of those cases which have had no contaminative vaginal manipulation and have had immediate diagnosis and early operation.

The cervix was patent to a No. 5 Hegar dilator at the close of the Sturmdorf operation and to a probe fifteen days later. Any gross blunder such as actually "sewing up" the cervix can therefore be dismissed.

(4) Am. J. Obst. & Gynec., April, 1926.

An Experimental Study of Rupture of the Uterus. The object of this paper by J. E. Lackner[5] is to present the findings of a series of experiments on rupture of the uterus in the lower animals, and to determine the more exact etiological factors in the causation of this condition.

The first series of experiments were conducted to determine if the type of incision in the uterus was a predisposing cause of rupture in a subsequent pregnancy. The second series of experiments were designed to determine if the type of suture material played an etiological role in rupture of the uterus.

Thirty-two female goats were used in these experiments. The goats were operated upon under strict surgical aseptic conditions. The incisions were sutured with No. 00 plain, chromic, and iodized catgut, and the subsequent pressure readings on these uteri were made from five to six months after operations.

The author's conclusion from this study is that the pressure required to rupture the uteri of goats operated upon is not affected by the type of incision or the character of catgut employed.

Inversion of the Uterus. L. E. Phaneuf[6] reports a case of inversion of the uterus and describes and illustrates the operation he performed. From a review of the literature he concludes that puerperal inversion of the uterus is a very rare condition. With constantly improving obstetric practice it will become even less frequent. The predisposing causes are inertia of the uterus, pressure from above, and traction on the cord from below. Shock is the leading symptom, and when this occurs after the third stage of labor, uterine inversion should always be borne in mind. In acute cases the uterus should be reinverted, manually when possible, as soon as the condition is discovered. In cases where this is not possible, laparotomy and reposition

(5) Surg. Gynec. & Obst., January, 1926.
(6) Am. J. Obst. & Gynec., February, 1926.

by taxis seem to give the best results. Chronic inversion is well treated by the vaginal method; anterior colpohysterotomy (Spinelli operation) when the uterus can be saved, vaginal hysterectomy when the opposite obtains. The shock should be combated by blood transfusion before attempting the operative procedures. The obstetric future of the woman who has had the Spinelli operation should be that of one delivered by a previous classical cesarean section.

Subcutaneous Emphysema of the Parturient Woman. The occurrence of subcutaneous emphysema during labor is rare, there being only 9 case reports in the German literature since 1875. Kosmak was able to collect 77 cases from the entire literature. W. Oppenheimer[7] reports a case of a primipara in whom subcutaneous emphysema occurred after a spontaneous labor which had lasted 34 hours. About three hours after labor the patient complained of pain in the neck and face and these parts of the body were found to be definitely blown up. Crepitation was easily obtained. The condition soon extended over the shoulders and down the chest to the nipples. Most of the emphysema disappeared after two days, but some was still present on the eighth. Aside from mild pain there were no symptoms at all. *X*-ray showed normal lungs. The emphysema in this case was due to strong bearing-down pains after a long labor. The baby was large and the pelvis was flat.

Nearly all the patients whose cases were reported in the literature were primiparas. The mechanism of the origin of the subcutaneous emphysema is as follows: In a primipara strong bearing-down pains produces increased pressure within the alveoli of the lungs. One or more alveoli rupture and the air escapes into the interstitial tissue, producing an interstitial emphysema. With each bearing down effort more air becomes interstitial and is forced along the branches of the

(7) Monatschr. f. Geburtsh. u. Gynäk., September, 1925.

bronchioles toward the hilus. From the hilus the air easily escapes into the loose mediastinal tissue high up, and so reaches the subcutaneous tissue in the region of the jugular vein or the median part of the clavicle. From here the air spreads further in all directions. Thus far there has been only one death reported from subcutaneous emphysema in a parturient woman.

On Contraction and Retraction Rings. In 1913 C. White[8] enunciated a theory which was, briefly, that the ring that is the cause of delay in labor is of different origin and pathology to that described by Bandl and which is found typically in cases of labor obstructed by some disproportion (as seen, for example, in cases of contracted pelves or transverse presentations). He also pointed out that a contraction ring that impedes the advance of the child is usually found over a depression in the child's outline, for example round the neck. Cases subsequently published have shown that this is a very common place for the ring to be found. Bandl's ring resulting from obstructed labor is not necessarily frequently found over a depression in the child's body.

Bandl's ring is found in cases where the uterus has undergone extreme retraction and therefore may be called Bandl's retraction ring if a fuller designation is required. In order that extreme retraction may occur it is necessary that there should be some obstruction to the presenting part being expelled. This is typically seen in a neglected shoulder presentation, where the thinned, tense lower uterine segment joins the thickened, retracted upper segment. In such a case the patient looks exhausted, has a rapid pulse and raised temperature. There is the history of a long labor.

Usually the presenting part is driven down hard into the brim and the child is almost certainly dead, as, owing to the state of the whole uterus, little oxygenated blood can reach the placental site from the ma-

(8) Am. J. Obst. & Gynec., March, 1926.

ternal blood vessels. Such a condition is seen typically, late in the second stage of labor.

The contraction ring which may occur early in the first stage of labor must be differentiated from Bandl's ring, which occurs as a result of obstructed labor.

The difficulty in differentiating the two conditions arises when a contraction ring occurs as the result of repeated manipulations performed in attempts to deliver a patient who has some obstruction to delivery such as a small pelvis.

Everyone will agree that the mortality will be less in cases in which the diagnosis is made early, but if the whole hand is introduced into the uterus to exclude a ring in every case where labor is delayed, it will mean a deep anesthesia in the middle of labor, and a considerable amount of unnecessary manipulation with an increased risk of septic infection (and prolapse of the cord.—Ed.).

Exploring the uterus only settles the diagnosis and treatment remains to be considered. In many cases even if diagnosed early, it is impossible to dilate the ring manually.

Unless the ring is easily dilatable, cesarean section seems to give the best results.

[Contraction rings may form in any part of the uterus where the circular muscle fibers can find a depression in the fetal cylinder. In my experience the most common site is the junction of the contractile portion of the uterus with the dilating portion, the so-called Bandl's ring. It is not wise to perform cesarean section in cases of contraction ring dystocia unless the obstruction is recognized fairly early in labor. Late in labor after numerous manipulations have been made, infection is usually present. If delivery from below cannot be effected in one sitting an instrument may be fastened to the presenting part and elastic traction applied,—aided by morphin, etc. As the baby is almost always dead there need be no compunctions about this method

of procedure. After several hours of elastic traction and narcotics the uterine spasm relaxes and delivery may be effected.—Ed.]

Shock in the Pregnant and Puerperal Woman. In the 1,477 deliveries on the Bellevue Hospital service during the past two years (six months' service in each year), which form the basis of this paper, H. Bailey and W. P. Driscoll[9] attribute 37 per cent of the deaths to conditions that ended in shock. When shock develops, the patient either suddenly or gradually in the course of an hour or two, acquires a rapid, thready or imperceptible pulse; there is a lowering of the systolic blood pressure to a point somewhere between 80 and 40 mm. of mercury, and, coincident with the lowering of the arterial pressure, there is a diminution in the CO_2 combining power of the blood. There is a blanching and sweating of the skin with pale mucous membranes, and a lapse into a partially conscious state, progressing to unconsciousness. During the development of the shock there may be deep respirations or so-called air-hunger. Occasionally there is present an element of nervous excitement and fear. Without treatment, death invariably ensues. These symptoms are usually classed as signs of hemorrhage, but the authors wish to point out that they are signs of shock and may occur in cases in which there is no loss of blood from the vessels.

The authors present an outline, giving the varieties of primary and secondary shock seen by them.

I. Surgical Shock
   a. Hemorrhage
   b. Intraperitoneal Irritation and Hemorrhage
   c. Traumatism to an Organ
   d. Distension of an Organ
II. Acidosis and Exhaustion Shock
   a. Acidosis
   b. Heart Depression
III. Vasomotor Shock
   a. Drugs
   b. Eclampsia
   c. Chronic Nephritis

(9) Am. J. Obst. & Gynec., March, 1926.

In the opinion of the authors, shock should be treated in the following manner: In patients exhibiting preliminary symptoms of shock and exhaustion, no operative procedure should be considered until the blood pressure is 100 mm. or above, and the operation should be conducted under gas and oxygen anesthesia, three parts to one, as suggested by Cannon. One should be prepared to encounter shock in the delivery of cases of accidental hemorrhage, placenta previa, long and difficult labor, eclampsia and chronic nephritis. Frequently more than one of the etiologic factors may be present. After acute hemorrhage a mechanical packer should be immediately inserted into the uterus and the uterine cavity packed with iodoform gauze. Usually it is well to pack the vagina also as it then acts with some resistance in the event of contractions. This is a prophylactic measure to prevent the further loss of blood.

In the presence of actual shock the patient should be placed with the head and shoulders lower than the rest of the body and given warm tap water by rectum, six ounces at a time. One thousand c.c. of normal saline solution should be injected by hypodermoclysis beneath the breasts. If the shock is complete and the blood pressure is 80 or below, 300 c.c. of gum glucose should be injected slowly, at the rate of 3 or 4 c.c. per minute. A universal donor should be brought to the hospital and if the blood loss has been excessive the patient should be transfused.

In nine cases in which the authors found it necessary to give gum glucose for shock there was a response in every case. One patient died within an hour from secondary hemorrhage and one died on the second day, but in the interval her systolic blood pressure ranged from 98 to 112.

[The Editor is not favorable to the use of gum in the blood. Glucose with salt solution should be administered.

Sterile dextrose solutions are now to be had, and may be kept in the delivery room for emergency.]

Obstetric Shock. The medical literature of the past few years has contained scattered references to a condition designated as obstetric shock, occurring under widely varying circumstances incidental to delivery. The clinical pictures described differ but little from those of pure surgical shock as it is universally known, but the material reported to date would indicate that additional factors may play a part in the production of shock complicating delivery.

The downward tendency of the systolic blood pressure is the first premonitory warning of impending shock, sometimes appearing as long as one to two hours in advance of the complete and tragic picture (DuPont). The routine observation of the patient's blood pressure at frequent intervals throughout the course of all operations has proved an invaluable aid in reducing surgical mortality and morbidity.

Routine curative treatment is variable in its detail, but certain principles must underlie any rational course of therapy. The restoration of body heat by external applications and by the administration of warm fluids is of primary importance. Morphia is usually helpful and immediate transfusion is imperative. In lieu of an easily available donor, a preparation of 6 per cent. gum acacia in physiologic salt solution has been recommended. Hypodermoclysis or proctoclysis are generally considered as inferior substitutes.

It has been casually known for some time, and the subject received considerable impetus in a work published by Bailey in 1911, in which profound shock was described during the course of labors complicated by sudden falls of blood pressure, whether produced by rapid delivery, by the use of veratrum viride, or by both. Experimental observations brought out the surprising fact that rapid emptying of the uterus might be accompanied by a sudden fall of as much as 100 in

the systolic reading, and the suggestion was made that elevated blood pressure might represent a protective mechanism which should not be regarded lightly.

In the wake of scattered reports, the more recent observations on obstetric shock are coming to emphasize a distinct clinical relationship between the collapse and certain associated or underlying toxic states incident to the pregnancy.

The work of Schwartz, published in 1923, as a result of his observation of specific cases of severe blood pressure reductions incident to labor, brings this concept to a head. Selected cases were studied chiefly with a view to noting any relationship between toxemia and shock, and among 80 normal cases, no significant blood pressure alteration following delivery was observed, even in cases with a slight hypertension. Notable or extreme falls in systolic tension occurred, however, in cases of chronic nephritis and less regularly in other types of toxemia. The drops in pressure might amount to 100 or more, would make their appearance from 2 minutes to 2 hours after delivery, and unless promptly restored, would result in death. Further, these blood pressure drops were prone to occur either in cases of rapid delivery or normal spontaneous delivery. That sudden release of intra-abdominal tension, *per se*, is not a sole causative factor, is practically proved by his observation that cases of hydramnios and distention incident to twin pregnancy do not induce hypotension upon delivery.

Close upon this report, appears the very significant work of Schickele. This contribution deserves due consideration because of the findings in four cases of obstetric shock which came to autopsy. In these instances, the liver showed grossly and microscopically multiple hemorrhages and necroses, resembling in every way those of eclampsia, with the exception that the lesions showed every evidence of being very recent.

Schickele concludes that so-called obstetric shock is a definite entity, dependent upon anatomic changes, but that, in the usual sense, it bears only the most superficial analogy to surgical shock.

Three cases of obstetric shock have occurred in the obstetric and gynecologic clinic of the Yale School of Medicine within six months and these are reported by E. L. Stone.

[Add to the causes of post-partum shock enumerated above,—rough squeezing of the uterus to expel the placenta, pituitrin, thymus shock, traction on cervix by pulling the fetus forcibly through it before sufficient dilatation has occurred.—Ed.]

Operative Obstetrics

Present Status of the Induction of Labor by Means of Pituitary Extract. There is no method of inducing labor that is absolutely free from danger to either mother or child. However, according to W. A. Scott*, the induction of labor by the use of pituitary preparations after castor oil and quinin, is practically free from maternal danger if properly used. This method has some dangers for the child even with the best of technic and this danger is considerably increased by improper use of the method. This danger consists for the most part of the evil effects of the occasional tetanic contractions which result, but such contractions can usually be controlled by the administration of an anesthetic. There is almost unanimous opinion among those using this method that the original dosage as proposed is too large and they either use smaller doses throughout or start with smaller doses and increase slowly. The method is being used much more extensively than one would gather from the literature, and those who have used it in a considerable number of cases are, for the most part, continuing to employ and have confidence in it.

(*) Am. J. Obst. & Gynec., October, 1926.

There is considerable confusion in the minds of many between the use of pituitary to induce labor, as opposed to its use during labor. It cannot be emphasized too strongly that when pituitary is used to induce labor, it should not be repeated once pains are established. To give the drug under such circumstances is the same as giving it early in the first stage of labor and there is no question about such a procedure being fraught with great danger.

Dilatation of the Cervix Uteri by Means of the Hydrostatic Balloon. In the induction of abortion, E. L. Stone[2] tells us that the hydrostatic bag has been employed at the Johns Hopkins Hospital with relatively gratifying results, particularly when the pregnancy has progressed beyond the third month. In view of the complete effacement of the cervix, spontaneous completion of the abortion is the rule. After the period of viability of the fetus has been reached, the indications for artificial dilatation of the cervix broaden perceptibly, and the bag finds favor in several groups of cases:

1. Induction of labor may be necessary for beginning disproportion, whether referable to pelvic contraction or postmaturity of the child.

2. Constitutional diseases often warrant the induction of labor, particularly toxemias of the nephritic type, intractable urinary infections, and occasionally eclampsia.

In contrast to these types of cases, there is the more tragic variety, which urgently demands a relative acceleration of the first stage:

1. The occasional instance of cervical dystocia or uterine inertia where the dilatation is excessively and often unexplainedly retarded.

2. The "hemorrhage" group, including all the placenta previa cases, as well as certain degrees of pre-

(2) Am. J. Obst. & Gynec., March, 1926.

mature separation of the placenta. In these instances the hydrostatic bag finds its greatest usefulness and is often the only rational procedure.

The bag, however, in common with most of its competitors, possesses the following inherent disadvantages:

1. Its introduction often forces the presenting part out of the pelvis, and this converts a potentially spontaneous into an operative labor, frequently necessitating version after the expulsion of the bag.

2. It tends to cause premature rupture of the membranes, with its associated liabilities.

3. The patient requires reasonably close supervision, since, when the membranes are already ruptured, the cord is liable to prolapse following the expulsion of the bag.

4. The risk of leakage from or of a collapse of the bag is a definite handicap.

In order to appraise the true value of the hydrostatic bag, the clinical material of the obstetric department of the Johns Hopkins Hospital has been reviewed from its opening in 1899 up to May 1, 1925. During this period, 14,822 cases have been discharged from the house service and the bag has been employed 178 times—the incidence being 1.2 per cent. or once in every 83.3 patients.

It was found that the likelihood of spontaneous delivery following the expulsion of the bag varies inversely with the size and development of the fetus. Version was the operation most frequently employed to effect final delivery and its incidence is practically the same at all periods of pregnancy. Manual dilatation of the cervix, as an adjunct, was most frequently necessitated in early pregnancy, doubtless due to the relative insufficiency of the uterine musculature in expelling the bag.

There were 11 cases of prolapse of the cord and 11 craniotomies. There was a maternal mortality from

infection of 1.7 per cent. and a gross morbidity of 34.87 per cent. The total maternal mortality for the series is 10, or 5.62 per cent. with the causes of death distributed as follows: hemorrhage, 3; infection, 3; shock, 2; toxemia, 2.

Of these cases, 5 were admitted in extremis from outside sources, so that the corrected mortality is 5, or 2.81 per cent. When it is recalled that the gross maternal mortality for all types of cases runs about 0.8 per cent. per annum and that the cases under discussion often represent the most serious surgical risks, the author is inclined to look upon this figure as reasonably small. The total fetal mortality was 65.8 per cent. and if the macerated fetuses are deducted the incidence was 45 per cent.

The extremes of success from the fetal standpoint fall within the toxemic group, with the best results in the nephritic class, and the poorest among the eclamptics. The hemorrhagic lesions show an average fetal mortality of about 75 per cent., varying in the cases of placenta previa, with the extent of the lesion.

Graphic comparison with the more conservative treatment under discussion is as follows:

	Uncorrected Mortality	*Corrected Mortality*
Accouchement forcé	15.70%	4.82%
Balloon	5.62%	2.81%

The present statistical study would seem to indicate that, although the ideal mechanism for artificial cervical dilatation has not been found, the conservative policy of later years has materially improved the results obtained.

Application of the Forceps to the Transverse Head for Delivery of Persistent Occipitoposterior Cases. H. C. Williamson[3] describes a method which has the advantage of requiring but a single application of the forceps. It is a combination of manual rotation of the head to a transverse position and the application

(3) Am. J. Obst. & Gynec., January, 1926.

of the forceps with the posterior blade in the hollow of the sacrum and the anterior blade under the symphysis. The blades thus face the occiput so that reapplication is not necessary.

It has been found that the best instrument for this and other midpelvic work is an Elliott forceps.

A positive diagnosis of the position is made by the palpation of an ear with the whole hand in the vagina. If one takes this precaution the head should never be drawn out in a posterior position. The next step is to introduce the proper hand to rotate and hold the head, the left hand in an R. O. P. and the right in an L. O. P. The hand is cupped in such a manner that the fingers are posterior to the head with the occiput lying in the palm. The palm then simulates the levator ani muscle. If this procedure does not rotate the head readily, firm pressure is made with the other hand upon the fundus, thereby forcing rotation on the artificial levator. By this maneuver, flexion is secured and the head held in the pelvis. This step is the crux of the whole procedure.

In the R. O. P. position, the right blade of the forceps is applied posteriorly and should be introduced first. Without withdrawing the hand which has acted as the levator, the blade is passed in the midline and the handle depressed. This is necessary in order to avoid the promontory and it keeps the blade in close apposition to the head. The hand being now withdrawn, the blade will hold the head in the transverse position. The second blade (left) is now introduced along the side of the pelvis and rotated into position. The technic is important as the blade has to pass over the baby's face. Its placing will be facilitated by depressing the handle, which will then cause the blade to slide with the utmost ease forward beneath the symphysis to the biparietal diameter of the head. Inasmuch as the right blade was introduced first it will

be necessary to cross the handles before they can be locked; this is easily accomplished.

The interesting feature of this procedure is now apparent, namely, that in many cases when the forceps is locked, the head instantly rotates to the anterior position. In those cases in which it does not, only slight rotation is necessary to accomplish this result. Rotation must always be completed before traction is made. Under these conditions there is no danger to the soft tissues.

One hundred mid- and high forceps cases treated by this technic are reported.

[There is much of value in this paper. We are gradually forsaking certain principles of the forceps operation which our old teachers taught as religious necessities. One is rotation before traction. The Vienna school always insisted upon traction with rotation of the forceps. Tarnier in 1881 advised lifting the head up a little and then rotating it with a full sweep of the handles of the forceps. Bill teaches this maneuver. The Editor prefers to raise the head, free it from the embrace of the soft parts, rotate it with the hand to an anterior position, then applying the forceps (holding the head in its new position, if necessary, by means of a vulsella). Nevertheless, it is sometimes needful to employ the older method, traction combined with rotation, to effect delivery in some cases.]

A Statistical Study of the Incidence and Treatment of Labor Complicated by Contracted Pelvis in the Obstetric Service of the Johns Hopkins Hospital, from 1896 to 1924. During the period from October, 1896, to October, 1924, 14,000 patients were admitted to the indoor service and of these, 11,630 individuals gave birth to 11,925 children which had passed the period of viability, the remaining 2,075 admissions being made up of abortions, women admitted postpartum or discharged before delivery, or who were not pregnant. Of the 11,630 individuals concerned, 6,407 were white

and 5,223 black and 3,100 of them presented contracted pelves. Routine measurement of the pelvic outlet was instituted only after admission No. 2,000. The present study by J. W. Williams and K. C. Sun[4] comprises 2,523 women with the usual types of pelvic contraction, who had 2,975 labors in the service.

The usual types of contracted pelvis occur somewhat more than four times less frequently in the whites (8.96 and 37.31 per cent.) while the incidence of funnel pelvis is practically identical in the two races.

Rickets plays an extraordinarily important part on the genesis of abnormal pelves in black and an almost negligible one in white women (15.23 and 0.83 per cent.). In the material rachitic pelves occur eighteen and one-half times more frequently in the former. While the simple flat pelvis is relatively frequently observed in white women and in general may be regarded as the pelvic abnormality par excellence in that race, it possesses but slight significance in black women.

With every additional half centimeter of contraction the colored woman has more spontaneous and fewer operative labors than the white woman.

This difference is due to several factors: in part to the lesser weight of the colored children, but more particularly to the smaller size of their heads, as well as their greater compressibility and malleability. Furthermore, it would seem that the lower nervous organization of the colored woman enables her to withstand with relative impunity a greater intensity of uterine contractions, as well as a longer duration of labor, than the white woman.

A graph which is based upon the analysis of 135 labors in white and 749 in colored women, shows clearly that the simple flat pelvis is much more serious to the former than the generally rachitic is to the latter.

(4) Am. J. Obst. & Gynec., June, 1926.

The authors maintain and prove the contention that the simple flat pelvis constitutes the contracted pelvis par excellence in the white woman, and in their experience it may give rise to serious dystocia even when mensuration indicates only very moderate anteroposterior shortening. Consequently they do not hesitate to state that in the white woman a simple flat pelvis with a diagonal of 10.5 centimeter is quite as serious as a generally rachitic one in a colored woman with one-half to one centimeter greater shortening, and that failure to recognize this fact in the past was responsible for the loss of not a few white children.

How can the difference be explained? The evidence points to the probability that the generally contracted rachitic pelvis should be regarded as a manifestation of degeneration and that the child takes part in the process, as manifested by its small size. On the other hand, white women presenting flat pelves, as a rule, manifest no signs of physical degeneration, frequently exceed the average in height and weight and have babies of more than the average size.

The considerations just adduced incline the authors to agree with Zangemeister that doubt should be cast upon the classical statement that in predicting the outcome in a given case, one-half of a centimeter should be added to the length of the conjugate vera of a flat pelvis in order to make it obstetrically equal to a generally contracted pelvis.

Premature rupture of the membranes, as well as prolapse of the cord, occurs more frequently in contracted than in normal pelves, and that the former adds to the severity of the dystocia while the latter materially increases the fetal mortality.

From the time of Michaelis and Litzmann, all writers have emphasized the increased frequency of abnormal presentations in labor complicated by contracted pelvis, and the authors bear out the correctness of their observations.

Breech presentations occurred approximately twice as frequently and transverse presentations thrice as frequently in contracted as in normal pelves.

The gross maternal mortality was 0.97 per cent. and the net maternal mortality was 0.44 per cent. The gross mortality was two and one-half times greater in the black women, and the net mortality was 3.8 times higher.

The gross fetal mortality was essentially the same in both races, 12.11 per cent. in 670 white, and 11.71 per cent. in 2,305 black labors. On the other hand, the mortality due directly to contracted pelvis was distinctly greater in the white children, and exceeded by two-fifths that of the colored children (6.73 and 4.12 per cent.). Such figures can only mean that more black children succumb to causes unconnected with disproportion, and a little reflection will confirm the correctness of such a conclusion, as we know that syphilis, prematurity and general debility take a much larger toll from them than from the whites. The net fetal mortality for cases 1-2000 was 4.73 per cent. For cases 2001-4500, it was 3.38 per cent., and for cases 4501-14000 it was 2.51 per cent.

For the study of the changes in the treatment, the twenty-eight years are divided into three periods: 1896 to 1905, 1905 to 1910 and 1910 to 1924.

The first period may be regarded as the premium paid to experience, and it is safe to say that the two most important lessons learned during it were: first, that when the patient is subjected to a test of the second stage of labor, a spontaneous outcome may occasionally occur under what appear to be most unfavorable conditions; and second, that convalescence after supravaginal hysterectomy is much more satisfactory than after the classical section.

The performance of 221 cesarean sections in the last series of 2,275 labors complicated by contracted pelvis, an incidence of 9.7 per cent., affords conclusive

evidence that the authors have not been unduly radical.

Williams has done a relatively large number of radical sections and he is aware that his practise may expose him to a certain amount of criticism. His reason for the choice of that operation is twofold. In the first place, it has given him extraordinary results in the presence of suspected or actual infection; the analysis of Harris of 64 such operations performed in his service up to 1922 showed that not a single death had occurred from infection, notwithstanding the fact that many of the patients were admitted in desperate condition. This favorable experience continued throughout the present series, and it was not until September, 1925, that the first patient died from infection following a radical section and in that instance autopsy showed that its source was an old pre-existing broad ligament infection, rather than anything immediately connected with the operation.

In the second place, Williams has employed the radical operation as the method of choice for effecting sterilization at a third or four section, particularly in colored women. In view of such satisfactory results, he was slow in taking up the low cervical technic. Primarily, it did not appeal to him on general surgical principles, and, notwithstanding the good results reported by many operators following its employment in questionable or actually infected patients, he was unable to reconcile himself to it, until Hofbauer had worked out in his clinic the peculiar histologic mechanism at the base of the broad ligament which apparently affords an unexpected degree of protection against infection extending directly from the cervix or originating in the pelvic connective tissue. During the past 4 years, however, he has done a number of cervical sections upon patients who had passed the time of election for the classical operation and in whom he would previously have resorted to a radical section; and, notwithstanding the fact that certain patients showed

signs of definite antepartum infection before interference, the results were unexpectedly good. None of the patients died, but many had a stormy convalescence and not a few went through a prolonged suppurative process, but eventually recovered.

It appears that small children are associated with all of the generally contracted types of abnormal pelvis, and relatively large ones with the simple flat and typical funnel varieties. Naturally, it is impossible to explain such variations satisfactorily but it would appear plausible to assume that the generally contracted types may be regarded as stigmata of degeneration, and that the imperfect development of the pelvis represents only one of the manifestations of the generally imperfect development which characterizes the entire individual. In this event, it would seem probable that the children would participate in the maternal characteristics.

On the other hand, it is a matter of clinical experience that the women with simple flat and funnel pelves are often large in size and present no manifest signs of physical degeneration, so that in many instances the abnormality would escape recognition except for routine pelvimetry and the clinical signs of disproportion. For this reason, it would appear that the shortening of the iliac portion of the terminal length of the innominate bone, or the presence of a sixth sacral vertebra, which are the casual factors in the production of the two types of pelvis, respectively, may be regarded as accidental occurrences.

[The shape and size of the pelvis have to do largely with the inherent growth tendencies of the bones, and these are under the influence of the endocrinal glands, mainly the thyroid and pituitary. Therefore in dyspituitarism and dysthyroidism we often find pelvic anomalies. The Editor has described a group of cases presenting such variants under the general term "Dystrophia Dystocia Syndrome." Its more common features

are, slightly justominor or masculine type pelvis, with other signs of hypopituitarism; undeveloped cervix and vagina; aged primiparity; prolonged pregnancy, indolent uterus, overmaturity of the child; nonengagement of the head, due usually to the pelvis or the rigidity of the soft parts; occiput posterior position; protracted first stage (inefficient uterus); premature rupture of the membranes; familial dystocia (the peculiarity of constitution is a family trait, perhaps inheritable); tendency to eclampsia and abruptio placentae.

It is highly desirable that the rôle of the constitution in the performance of the function of childbirth be given more attention from our investigators.]

Trial Labor in the Treatment of 477 Cases of Contracted Pelves. The Cornell teaching service, during the years 1922 through 1925, delivered 9,087 women on three services—Bellevue Hospital and the Bellevue School for Midwives during six months of each year and the Berwind Maternity Clinic during twelve months. There were 477 cases of contracted pelves or 5.2 per cent. As far as possible, the treatment of the patients was by trial labor and in the opinion of H. Bailey*, the success of the procedure depended upon the fact that the low flap cervical section was done in cases in which the head did not engage. There were 59 cesarean sections with no maternal deaths and three infant deaths. In the 22 elective sections, there were 14 low flap operations. Four patients had postoperative temperature. The wound was infected in three cases. Vaginal examinations were made in two cases, but with no morbidity in the postpartum period.

Thirty-seven patients had a section following trial labor and of these, 35 were operated upon by the low flap method. In the group there were 11 cases that had been examined vaginally. The study of the convalescence shows that 21 of the patients had a temperature of 100.4 degrees or higher for 2 days or more, 4 had a temperature for two days, 12 for less than 5 days, 1 for

(*) Am. J. Obst. & Gynec., October, 1926.

6 days, and 4 for 8 days. The wound healed by primary union in 28 cases with postoperative temperature; in 2 cases it broke down, and in 7 cases there were stitch abscesses. Only one of the patients had a serious postpartum condition; in most of the others the fever occurred in the first few days following operation. The author feels that the protection of the incision will eliminate some of the infections, as it is probable that these occur when the child and the membranes are brought through the wound. The postoperative period was peculiarly free of the complications that usually follow the classical section.

As an end-result of trial labor, in the 477 cases, there was a gross mortality of three mothers, two dying of sepsis and one from anesthesia in a hospital not under the author's control. If we except the patient with sepsis following spontaneous delivery, there was a net mortality of two, or one in 238 cases. There was a gross mortality of 29 babies or a net mortality of 20. There was then a maternal death rate of .42 per cent. and an infant death rate of 4.19 per cent. Trial labor in relatively contracted pelves reduces the incidence of operation and results in a minimum mortality for mother and child provided that when a cesarean is necessary the low flap cervical section is employed.

Elimination of the Second Stage of Labor in Breech Presentations. A study of the fetal mortality in primary breech presentation as shown by the records of the Boston Lying-in Hospital for the ten year period from 1914 to 1923 inclusive is one of the main objects of this paper by F. C. Irving and T. R. Goethals[5]; the other is to summarize the conclusions to be drawn from one year of special assignment work on the subject of breech deliveries.

The ten year series yields 235 primary breech deliveries with 23 deaths, a mortality rate of 9.78 per cent. These are divided between 94 primiparous deliveries with 12 deaths, a 12.7 per cent. mortality, and 141 mul-

(5) Am. J. Obst. & Gynec., January, 1926.

tiparous deliveries with 11 deaths, a rate of 7.8 per cent.

Because of the high fetal mortality rate at the hospital for the year 1920, the authors were given the special assignment of all breech deliveries for a twelve month period beginning March 1, 1921. Whereas, previous to this period breech cases had been handled routinely by the staff member on service or by the house officers acting under his direction, it was felt that if a definite method of delivery were followed under strict supervision, the fetal results might be improved. Therefore, during the time of the assignment all primary breech deliveries were conducted by or supervised personally by the authors. The routine method of procedure was in outline as follows:

1. Careful auscultation of the fetal heart throughout labor.

2. Policy of "hands off" during the first stage, except when, because of lack of progress after rupture of the membranes prematurely, a Voorhees bag was inserted to aid dilatation or to stimulate efficient uterine contractions.

3. Immediate extraction after full dilatation.

The technic of extraction included the freeing and bringing down both feet by the Pinard maneuver, in the cases of frank breech; the keeping of the baby's back anterior until the scapulae were well down in sight; the delivery of the arms anteriorly under the symphysis, one after the other; and the delivery of the head either by Mauriceau's maneuver combined with suprapubic pressure, or by application of forceps in the occasional case. The bringing down of one arm before beginning the extraction was done in several of the cases, and the hand held down alongside of the baby's hip by means of a fillet around the wrist. This maneuver may be of value in the case of an overlarge baby, but is of no advantage as a routine method. The authors believe that better results are obtained if the

posterior rather than the anterior arm is thus secured. In a series of 30 cases, the fetal mortality was 6.6 per cent.

Figures given by the authors indicate that breech presentation deserves its reputation for jeopardizing the baby. They indicate that breech deliveries entail a higher fetal mortality than any form of delivery by the presenting occiput save the operation of high forceps. Therefore, the method of conversion of the breech presentation into a vertex by external version

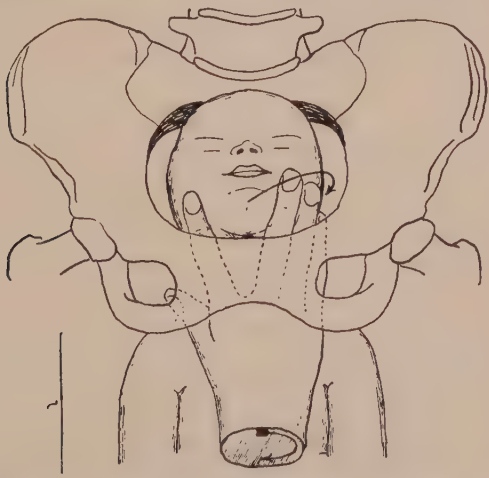


Fig. 3.—The best method of delivering the aftercoming head when the face has rotated anteriorly. The chin is grasped between the index and middle fingers of the operator and rotated posteriorly. The index finger is then inserted in the mouth of the fetus, the head flexed, and delivery effected in the usual manner.

deserves at least a trial if the case is recognized either before labor starts or early after it has begun. If the case in which a breech presents is deemed suitable for delivery via the pelvic route the baby should be extracted as soon as full dilatation of the os has occurred, rather than be submitted to the dangers resulting during the second stage from compression of the cord and from premature separation of the placenta.

[In breech deliveries one must be sure of complete dilatation before extraction is attempted, and one must remember that more babies are killed by violence in delivery than by asphyxia from slow extraction.—Ed.]

The Management of Persistent Occipitoposterior Position. According to C. S. Bacon[6], there should be but one definition of persistent occipitoposterior position. It is the condition that results in skull presentation from the rotation of the occiput backward toward the sacrum. This occurs only when the head enters the pelvis with the occiput more or less posterior to the transverse diameter of the pelvis.

A primary occipitoposterior oblique position above, at the inlet or during descent is not abnormal, and rotation anteriorly occurs in 80 per cent. of all such cases. No attempt should be made to rotate at this stage. If intervention becomes necessary, we may have to choose among a high forceps, version, pubiotomy or cesarean section. If a high forceps is selected, the Kielland forceps is the best instrument to use, but it is used first as a tractor, and not until the pelvic floor is reached is rotation attempted. This problem of aiding descent however, is quite different from that of managing occipitoposterior rotation and should not be confused with the latter. Premature intervention with spontaneous descent in either the occiput oblique posterior or anterior position is to be deprecated for all high forceps operations are the most serious of obstetric operations.

After descent, complete dilatation of the cervix is generally necessary for the long or anterior rotation. Hence artificial rotation should not be attempted until this is secured. In persistent occipitoposterior rotation, as well as in persistent deep transverse arrest, we should first attempt manual rotation, remembering that changing the extension attitude into a flexion is always of the first importance.

(6) J. A. M. A., Feb. 13, 1926.

In case of failure with manual rotation, the Kielland forceps should be applied with their pelvic curve toward the occiput and in the long occipitomental diameter. Then the head should be flexed and rotated, after which the head is delivered in the usual way. If manual rotation fails and no Kielland forceps are at hand, we may use a Naegele or Simpson forceps in the Scanzoni maneuver, remembering, however, to apply them in the occipitomental diameter and to flex the head before rotating.

[It seems we will never come to agreement on the treatment of occiput posterior positions. The Editor feels that this subject is more important than cesarean section, pubiotomy, etc., because more babies are lost by improper treatment of this anomaly than are saved by the operations named. The Editor is not very enthusiastic about the Kielland forceps, feeling that it is the man behind the instrument, not the forceps itself. One can do everything that is safe to do with a long Simpson. Nägele's forceps has a murderous cephalic curve and too pronounced a pelvic curve. A new forceps has been brought out by Barton—embodying a very old principle. It has some slight promise of being useful, and theoretically should be safer than the Kielland. One thing in its favor,—it is so lightly built that one can hardly exert enough power to do damage with it.]

Axis-Traction Forceps — Their Place in Obstetrics. According to J. J. Gill[7], Tarnier's axis-traction forceps are the ideal instruments for inlet plane deliveries. They are also of great advantage when the head is caught in the sacral cavity. They serve best in borderline cases when indications for version have passed, cesarean section is unattainable and mutilation is unwarranted. Experience alone enables one to judge conditions of the soft parts, to realize the limit of space between head and pelvis and to appreciate the still further effect of traction. Through practice one

(7) Illinois M. J., September, 1926.

acquires the skill to repair any damage inflicted either from choice or by accident. [?—Ed.] The head stethoscope is a convenient essential in detecting signs of fetal asphyxia to determine the necessity for a hasty delivery. Axis-traction forceps engender dangers and difficulties which if recognized may be avoided.

Forceps Applied to the Breech. A. Hermstein[8] reports four cases of breech presentation which were successfully delivered with forceps. He believes that in a breech presentation when the hips are in the pelvic cavity in such a way that the bisiliac diameter runs transversely, the condition is unphysiologic and as anomalous a position as transverse arrest is in head presentations. In these cases extraction alone will not suffice because rotation of one hip to the front is necessary. For this purpose the Kielland forceps are especially adapted.

Forceps Applied to the Breech. B. v. Varo[9] reports that in his clinic the Kielland forceps were employed to deliver seven cases of breech presentation. The forceps hold the breech best when they are applied to the hips, that is when they grasp the right and left sides of the child. This enables the forceps to grasp bony prominences because the forceps will only hold when they grasp the iliac crests and the greater trochanters of the femurs. When the back of the child is to one side of the mother, such a grasp is impossible with the usual type of forceps, because they cannot be applied in the antero-posterior diameter of the pelvis. The Kielland forceps, however, can be applied in any diameter and hence should be used for breech presentations. Proper application of the forceps to the breech is not more dangerous to the mother and child than the application of forceps to the head and delivery is not more difficult.

(8) Monatschr. f. Geburtsh. u. Gynäk., November, 1925.
(9) Monatschr. f. Geburtsh. u. Gynäk., April, 1926.

[In 35 years' practice and in various hospital services totalling about 60,000 cases the Editor has never heard of the need of the forceps on the breech.]

Median Deep Episiotomy to Prevent Prolapse of the Uterus. It is the general impression that prolapse of the uterus is due to laceration of the vagina and perineum. Henkel[1] does not believe this because if this statement were true, the most extensive lacerations should produce the largest prolapses. This, however, is not true, for every large prolapse would have to be preceded by a third degree laceration.

Most lacerations of the perineum are due to the quick exit of the child—head or breech—through the vulva and are due to an acute overdistention of the tissues. Such lacerations can be sutured with good results. However, when a head remains on a perineum for a long time after complete dilatation of the cervix, there results from the pressure, anemia and overstretching of tissues, such extensive damage that the tissues do not return to their normal state during the puerperium. Conditions are especially unfavorable when there exists a diminished tonicity because of undernourishment or when there is some constitutional inferiority.

Other factors which may prevent a return of the tissues to normal during the puerperium are a full bladder, constipation, great straining during defecation, getting out of bed too early and early resumption of work. These reasons explain the great frequency of prolapse among working women.

Because of these facts Henkel has during the last few years shortened the second stage of labor whenever possible. This he accomplished by splitting the perineum in the median line as soon as it bulges. The cut is made in the vagina and perineum and is extended downward until the sphincter ani muscle is visible. In cases of fetal asphyxia such an incision will save many babies.

(1) Zentralbl. f. Gynäk., Mar. 27, 1926.

[This sounds perilously like some of the heresies of which the Editor has been accused! Max Henkel, beware! Soon you will be doing "prophylactic forceps" and if you don't watch out the goblins will catch you! But, seriously, with all due respect to Henkel's presentment of the facts, and to his own convictions of the superiority of art over nature, the Editor must repeat what he has stated unequivocally on several occasions, namely, that while the obstetric specialist, in his own well staffed and technically perfect maternity, may try it, and will improve on nature, for the doctors in whose hands the towering majority of births occurs, the old time-tried "watchful expectancy" should be the guiding rule. There is at present too much interference in normal labor.]

Cesarean Section at the Cook County Hospital for the Past Eleven Years. In the period from November 5, 1914, to August 27, 1925, there were 170 cesarean sections performed in the Cook County Hosital, Chicago. H. F. Lewis[2] analyzed these cases but could use only 158 of them. During this period of eleven years there were 15,000 deliveries at or near term in this hospital. The incidence of these operations was 1.1 per cent., or 11 per 1,000. There were 16 deaths in this series of 170 cesarean sections, a mortality of 9.4 per cent.

There were 29 women who had undergone cesarean section one or more times previously.

The postoperative temperatures and course were as follows:

Degrees F.	*Class*
Over 104	A
From 104 to 102	B
From 102 to 100	C
Under 100	D

The classical cesarean was performed in 12 A cases, 21 B cases, 40 C cases, 14 D cases, with a total of 87 cases.

(2) Surg., Gynec. & Obst., June, 1926.

The low cervical section was done in 7 A cases, 8 B cases, 16 C cases, 4 D cases, with a total of 35 cases.

The transverse cervical section was used in 2 A cases, 2 B cases, 6 C cases, 3 D cases; total, 13 cases.

The longitudinal fundal section was used in 1 A case, 4 B cases, 9 C cases, 2 D cases; total, 16 cases.

The Porro cesarean section was used in 1 A case, 1 B case, 2 C cases, 2 D cases; total 6 cases.

The longitudinal fundal operation leads as to safety both in the mortality and in the morbidity tables. The transverse cervical comes next in morbidity but not in mortality. The low cervical comes after the longitudinal fundal in mortality but below the transverse cervical in morbidity. The classical operation has a worse mortality record than any except the Porro and the vaginal, but leads the two cervical operations in morbidity average.

Among the 158 cases here reorted there were 16 deaths. This indicates a mortality of 10.1 per cent. in the cases amenable to complete study. On the other hand, it must be remembered that there were 12 cases which could not be completely analyzed because of the loss of the histories, but which other records show did not die. Therefore a correct mortality record must include these cases in the percentage. There were then 170 cases recorded, with 16 deaths. The true death rate consequently is 9.4 per cent. Furthermore, the patients come from a class which is full of prejudice, which is mostly ignorant and largely poverty-stricken. They do not come early enough. Many of them are attended by midwives or by inexperienced neighbors. Very few have been under the care of experts before they are admitted, while few have had much prenatal care of any great value. Details of the fatal cases are given.

There were four deaths which perhaps could not fairly be charged to the operation *per se* because of peculiar circumstances concerning the operations. If

the author is allowed these four alibis the percentage of deaths on the basis of 166 cases would be 7 per cent. On the basis of 154 cases the percentage would be 8 per cent.

There were 10 deaths with the classical operation, or 11.5 per cent.; 2 by the low cervical, or 5.7 per cent.: 1 by the transverse cervical, or 7 per cent.; 3 by both cervicals, or 6.2 per cent.; no deaths with the longitudinal fundal; 2 with the Porro, or 33.3 per cent.; 1 by the vaginal, or 100 per cent.

Another type of operation has been done by two of the attending obstetricians for a few years. This the author calls the longitudinal fundal cesarean, of which there were sixteen cases. The abdominal incision, long enough to allow dislocation of the uterus, is made in the median line about half above and half below the navel. After the uterus has been everted the abdominal wound is temporarily held together by means of one or two vulsella and the base of the uterus is lightly backed with gauze. Thus the spill is well controlled and rarely does any fluid leak into the belly. The uterine incision is made longitudinally in the median line of the fundus of the uterus, large enough to permit delivery of the baby and extending equally fore and aft. By tilting the uterus the spill can be directed away from the wound. One advantage is that the uterine wound is as far as possible away from the usual source of infection, which is almost always via the genital canal. It is the ideal method for the case of placenta previa in which the cesarean operation may sometimes be indicated.

[The Editor would disagree with the author in the last statement. Hemorrhage in placenta previa comes from the relaxed lower uterine segment and from cervical placental insertion. This hemorrhage cannot be easily controlled from the fundal incision. When the aperture in the uterus is over the bleeding placental site one can gain easy access to the bleeding points and can suture

them in the same manner as any other bleeding surface is treated. The Editor has sutured the sinuses in the placental site in three cases of laparo-trachelotomy.]

Technic of Transperitoneal Cesarean Section. The following is J. O. Polak's[3] method of performing the transperitoneal cesarean section: A median incision below the umbilicus is made through the skin and fat. The fascia and peritoneum are opened to the full length of the wound. This exposes the lower segment of the uterus with the bladder carried up to about the middle of the wound. The wound edges are protected with wet gauze towels and retracted, a traction suture passed through the uterus and grasped with forceps, holds the uterus taut against the anterior abdominal wall. The bladder reflection of peritoneum is picked up with tissue forceps incised with curved Mayo scissors which are passed beneath the uterovesical fold and spread to separate it—this allows the superficial layer of peritoneum to be cut across, care being taken not to get into the deeper tissues and so traumatize the superficial veins. The bladder is then detached by blunt dissection as in hysterectomy, and retracted with the Deaver retractor. With traction on the "traction suture" above, and retraction with the Deaver retractor below, the uterus may be readily incised with little or no bleeding unless the placenta happens to be under the uterine incision. Care must be taken to make the uterine incision of sufficient length to permit of the easy expulsion of the head by pressure from above upon the uterus through the abdominal walls.

It is best when possible, to deliver the child by the head, for podalic version and extraction are apt to extend the incision in the uterus and cause irregular tears of the uterine muscle. The traction suture at the upper angle of the wound holds the uterus against the abdominal wall and prevents any eventration of the intestines. The uterine wound is now sutured, the

(3) Surg. Gynec. & Obst., April, 1926.

suture beginning at the upper angle. No. 2 chromic catgut is used on a Hagedorn needle. Each suture in the upper third of the wound passes through the serosa, the entire thickness of the uterine muscle on the one side, just skipping the endometrium, and through the muscularis and serosa on the opposite side. In the lower two-thirds only the muscle is included in the stitch. These sutures are placed at half inch intervals. Their ends are clamped and held.

The time consumed in placing the sutures allows the uterus to contract and retract and separate the placenta. In clean cases Polak has found it best to allow the placenta to separate spontaneously and then after its removal to pack the cavity of the uterus with washed iodoform gauze, leaving the gauze in situ to be delivered through the cervix by uterine contraction. After the placenta is delivered and the gauze inserted, the sutures already in situ are tied and closure of the uterus is completed by placing superficial sutures through the muscularis and serosa and through the muscularis alone between each two of the deeper sutures. In the upper third of the wound, this causes a slight infolding of the edges of the serosa. When the uterine wound is closed and the ends of the sutures cut short, the wound is covered with the bladder reflection. This is done with a continuous suture which is begun at one round ligament and is finished at the opposite round ligament, the peritoneal flap being carried across the front of the uterus covering the uterine wound.

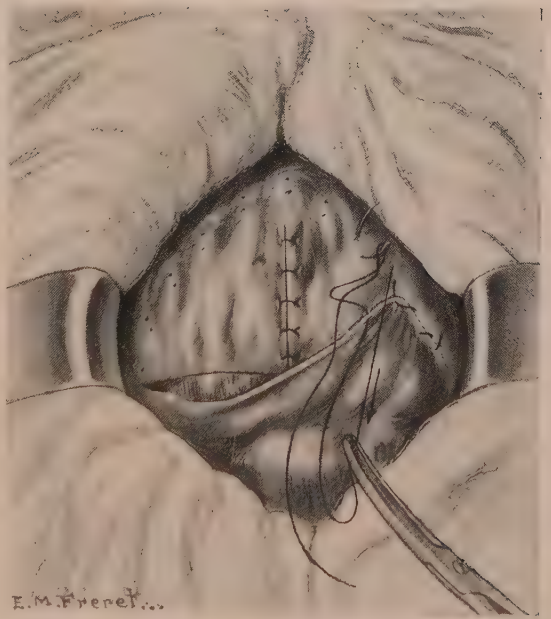
It has been the custom of the author to add to the safety of this exclusion by making a second line of sutures which infolds the first, and effectually seals the uterine wound from the possibility of peritoneal leakage. It is immaterial when there is sufficient bladder flap whether we make the upper peritoneal flap as suggested by Beck or not.

In potentially infected cases, in which the membranes have been ruptured for a long time and the

PLATE V.

A, Traction stitch. *B*, Separating bladder reflexion. Incision walled off with gauze packs. This case had a very low bladder attachment. —Polak, page 179.

Bladder retracted downward. Incision through uterine wall.



Bladder peritoneum sutured over uterine wound. Downward pull of anterior face of uterus by traction on sutures.—Polak, page 179.

PLATE VI.

cervix is fully dilated, the placenta, after it has separated, may be expressed through the cervix into the vagina as in the normal case, by simply making traction on the untied sutures which have been placed in the uterine wound, thus closing it at the same time that the Credé maneuver is used. The uterus is then packed through the uterine wound as already described, and the sutures tied and cut. The subsequent exclusion of the wound is carried on, as in the relatively clean case.

The after-treatment of these patients should be as follows: After the woman has reacted, she is placed in a moderate Fowler position, with a Harris drip. She is given a course of ergot and pituitrin: one ampule of pituitrin immediately upon closing the uterine wound, and 15 minims of ergotol every hour for 6 hours after her return from the operating room. The other treatment consists of routine morphia in 1/12 gr. doses every 4 hours for the first 24 hours; water on the cessation of vomiting; and a soft diet after the first 36 hours. (Plates V and VI.)

[The Editor could never see the rationale of expressing the placenta through the cervix and vagina.]

Conservative Cesarean Section by the Lower Uterine Segment Incision. The dangers and possible complications of the lower uterine segment operation are few. The uterine incision, described in this article by J. M. Munro Kerr and J. Hendry[4], is made in a transverse direction, so that there is ample space in which to open the lower uterine segment without even disturbing the bladder. When the operation is performed too early in labor, or when the head is exceptionally large, there may be difficulty in securing sufficient breadth of the uterine incision for the delivery of the head. To avoid damage to the large vessels at the side of the uterus at this stage, the incision may with advantage be made in a curved form with the convexity directed downward.

(4) Surg. Gynec. & Obst., July, 1926.

The patient is placed in the Trendelenburg position. One-half c.c. pituitrin is injected into the triceps muscle to secure prompt contraction when the uterus is emptied. A longitudinal incision, about 6 inches in length, is made through the abdominal wall in the middle line, the lower end just reaching the symphysis pubis. The lower end of the wound is then retracted over a protecting layer of gauze. The rest of the abdominal cavity is protected by packing off the upper portion of the operation area with gauze. A transverse incision is made through the loose peritoneal

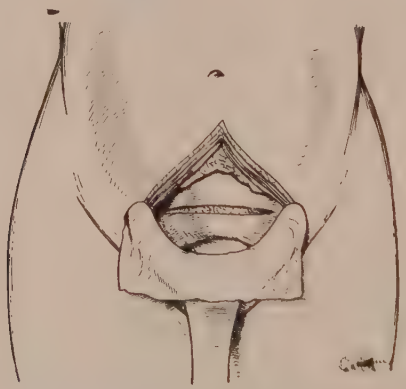


Fig. 4.—Incision through loose peritoneal covering of uterus.

covering of the uterus, about half way down the lower uterine segment. A curved incision as described is then made through the uterine wall in the same region. When the center of this incision is complete, a blunt-pointed bistoury is employed to extend it in either direction to the required degree. If the head is not easily accessible, pressure on the fundus through the abdominal wall often brings the occiput into the wound. To avoid handling, especially in presumably infected cases, the head may then be grasped with a pair of short obstetric forceps used as guides and not as trac-

tors, and the delivery completed by pressure on the fundus. The umbilical cord is ligated and divided in the usual way. A self-retaining retractor is now inserted to keep the sides of the abdominal wall apart. If the cervix is not well dilated, the placenta is delivered by compression of the fundus through the abdominal wall and traction on the cord. An intramuscular injection of a sterile preparation of ergot is given at this stage. If the cervix is known to be well dilated, and this is a most important advantage in an infected

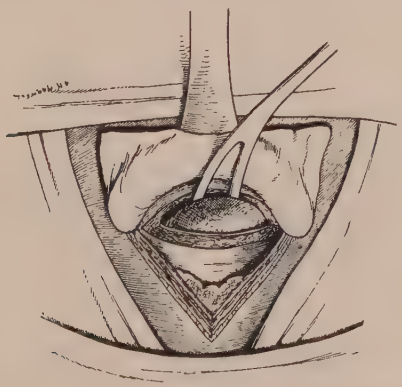


Fig. 5.—The head may be picked up with short obstetric forceps which are used as guides, not tractors.

case, the placental end of the cord is dropped back into the uterus, the placenta and membranes being expressed per vias naturales when the abdomen has been closed. By this means, intrauterine manipulations are reduced to a minimum. The edges of the uterine wound are now picked up with fine tissue forceps or temporary silk ligatures. The mucous membrane, with the innermost portion of the muscle coat, is sutured with a continuous No. 1 chromic gut suture, the edges of the mucous membrane being directed inward toward the uterine cavity. The remainder of the muscle coat is carefully approximated and sutured with a continu-

ous No. 2 or No. 3 chromic gut suture. Great care must be taken to secure completely the lateral extremities of the incision. The peritoneum over the uterus is closed with a continuous No. 1 or No. 0 catgut suture, the operation area being thus completely shut off. The gauze packing is removed and the abdominal wall carefully closed in layers. (Figs. 4, 5, 6.)

The authors have found the prognosis to be very satisfactory, and the uterine scar, as evidenced by

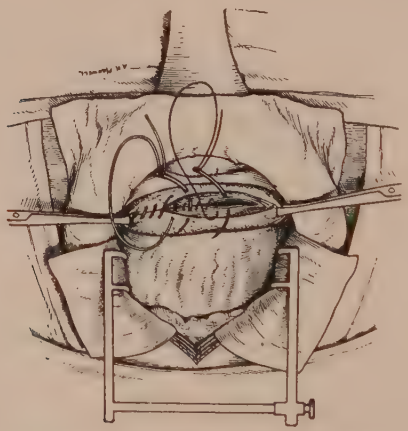


Fig. 6.—Self-retaining tractor has been inserted and suture of wound commenced.

"repeat" operations, has proved sound in all cases except one, in which there was definite thinning at the right end of the scar. In most cases no trace of the scar could be found.

The uterine incision is a transverse one, which the authors think better than the longitudinal one very frequently employed. With the latter there is a risk of the upper part of the wound extending into the active contractile portion of the uterus, and this occurred definitely in four out of all the five cases

recorded, of subsequent rupture of a lower uterine segment scar. Those cases were recorded by Wolff, Franz, Freund and Baisch. The extension of the longitudinal incision downward has resulted in several cases of injury to the bladder.

A great advantage of this operation over the classical one, is that the operation area can be completely closed over with peritoneum, and consequently postoperative adhesions are seldom found. In the author's experience the widespread adhesions after the classical operation form a very considerable operative difficulty when a second cesarean section becomes necessary.

The following is a brief summary of results in a series of 107 cases:

Cases	*Total*	*Maternal Mortality*	*Percentage*
"Clean"	82	0	0
"Doubtful"	25	4	16

The subsequent labors in 26 of the above cases was as follows:

	Cases
Second cesarean section of the lower uterine segment type	17
Second cesarean section of the classical type	6
Spontaneous delivery of a smaller child	2
"Low forceps"	1

There were no maternal deaths in this series. In only one of the cases already referred to was any thinning of the scar found at the second operation and that in a case in which the patient had been several hours in labor.

[The Editor has not made the transverse cervical,—or rather, to be anatomically correct,—the isthmial incision. He has very seldom found it necessary to cut into the fundus, even in sections done before labor, and the median incision which he practices has never torn further into the bladder. One would expect more bleeding from the transverse incision. Kehrer invented this form of section in 1881, but no one paid heed to him.]

Seven Years of Cesarean Section. H. v. Broich[5] analyzed a series of 201 abdominal and 157 vaginal cesarean sections. Nearly all of the former were of the transperitoneal cervical type. The maternal mortality for the abdominal operation was 8 per cent. and for the vaginal operation it was 7 per cent. Among 15 cases of cardiac disease there were 6 abdominal operations with 5 deaths and 9 vaginal operations with 1 death. In these cases lumbar anesthesia was used mostly but occasionally ether was added.

In the author's clinic eclampsia is treated by cesarean section. Among 17 abdominal operations there were 4 deaths and among 15 vaginal operations there were 5 deaths. In eight cases of threatened eclampsia abdominal cesarean section and in 18 cases vaginal section was performed without any maternal mortality. Since placenta previa has been treated by cesarean section the mortality of both mother and baby has been materially reduced. Among 87 vaginal cesarean sections the maternal mortality was 3.4 per cent. and among 13 abdominal operations the mortality was 7.7 per cent.

In 148 cases cesarean section was performed for contracted pelvis. Among 116 first transperitoneal operations the mortality was 2.6 per cent., but one patient died of a frontal sinus abscess and autopsy revealed normal abdominal contents. The corrected maternal mortality therefore was 1.7 per cent. Among nine extraperitoneal operations there was no mortality. Of the 23 patients who had repeated cesarean sections, 2 died after rupture of the abdominal wound. The entire mortality for the cases of contracted pelvis was 2.8 per cent. In 8 cases of breech presentation in elderly primiparas abdominal cesarean section was performed with no mortality. There was primary union in 91.4 per cent. of the vaginal cesarean sections and in 80 per cent. of the abdominal cases.

(5) Monatschr. f. Geburtsh. u. Gynäk., April, 1926.

Results of Seventeen Cervical Cesarean Sections. Le Lorier[6] performed his first cervical cesarean section in May, 1925. The result was so good that since then practically all his cesarean sections have been of the cervical type. He reports 17 of these operations with one death which resulted from a hemorrhage four hours after the operation. One child died while preparations were being made for the operation. All the others lived. The indication in 12 cases was contracted pelvis, in 2 placenta previa, in 2 prolapse of the cord and in 1 a cyst of the ovary. Three of these patients had previously had a classic cesarean section. The usual closure of the wound consisted of a single row of interrupted catgut sutures. Where the wall was thick, two rows were used. The delivery of the child was nearly always accomplished with the hand by enucleation or expression. The patients made better recoveries than do women after the classic operation.

The Value of the Low Transperitoneal Cesarean Section. V. Cathala[7] has performed three low or cervical cesarean sections and objects to the operation on the following grounds: The operation is performed with the patient in a sloping position and the liquor amnii hides the field of operation. The lower uterine segment hugs the baby's head tightly, especially when the membranes are ruptured. This necessitates great care to avoid injuring the child and may result in hemorrhage. The extraction of the fetus is difficult. In case of hemorrhage it is easier to control it in the classic operation than in the cervical. The claim that there is less risk of infection of the peritoneum in cases of infected liquor has not been demonstrated. The uterine wound in the lower uterine segment is not stronger but weaker than the wound in the fundus of the uterus. In clean cases the classic operation is superior to the cervical, whereas in unclean cases they

(6) Bull. Soc. d'obstét. et de gynéc., June, 1926.
(7) Bull. Soc. d'obstét. et de gynéc., January, 1926.

have equal value. In frankly infected cases hysterectomy or exteriorization of the uterus should be done. In a series of 110 classic operations the author had three maternal deaths (2.7 per cent.), one from shock and two from peritonitis.

[The "shock" case was probably bursting of the uterine suture by the after-pains. This does not happen with the low operation.—Ed.]

Concerning the Low Transperitoneal Cesarean Section. Couvelaire and Portes[8] have performed the low or cervical cesarean section 30 times in both clean and unclean cases. Ether was used 15 times, chloroform 7 times and spinal anesthesia 8 times. There was one death, but this could not be attributed to the operation. The authors believe that the cervical operation is more difficult to do, but at the same time it is more satisfactory than the classic operation because the suturing is done in the noncontractile portion of the uterus and will not be subjected to the powerful uterine contractions which sutures in the body of the uterus must withstand. Convalescence is much smoother than after the classic operation and the cervical operation is less dangerous in the cases where the uterine contents are not absolutely sterile.

[The low, or cervical cesarean is making numerous converts in France since the War. Strassbourg is now French and the operation was popular there. Some good has come out of the War.—Ed.]

The Low Transperitoneal Cesarean Section. Among 28 cervical cesarean sections performed by Portes and Risacher[9] for cephalo-pelvic disproportion, 22 were done under general anesthesia and six under spinal. The cases were divided into three groups. In the first or noninfected group, of which there were 6 cases, the convalescence was perfect. In the second or "suspect" groups, of which there were 19 cases, there were three

(8) Bull. Soc. d'obstét. et de gynéc., October, 1925.
(9) Bull. Soc. d'obstét. et de gynéc., May, 1926.

cases of prolonged fever and one patient died of post-operative peritonitis. The third group consisted of a single definitely infected case which ended in recovery.

The Low Transperitoneal Cesarean Section. In 1923 A. Brindeau[1] performed 21 low cervical operations and his mortality was 18.04 per cent., but all these cases were infected. Since April, 1924, he has performed 88 low cervical cesarean sections with only one death. (1.1 per cent.). He feels that the low operation even in clean cases is superior to the classic operation. After this operation one seldom finds secondary peritonitis, adhesions, fistulae, and rupture of the wound, complications with which one must reckon in choosing the classic operation. Nearly all the operations were performed under spinal anesthesia. However, there are certain dangers in this form of anesthesia for among 231 spinal anesthesias in pregnant women there were two deaths.

[The Editor prefers local anesthesia for all cesarean sections. It must not be expected that all suspect and truly infected cases will get well after the cervical cesarean section. Many of these women would die in delivery from below, and some few also if a Porro cesarean were done. The Editor is enthusiastic about the low incision and has sixteen reasons for claiming that it is better than the classic. It is interesting to observe a man's conversion to the new operation. First he says his results are so good with the classic cesarean that he needs no other. Then a clean classic section dies of peritonitis. Then he makes a "low classic incision" and covers part of the wound with the bladder. Then he finds how, even with the partial benefits of this low incision, his patients do better and he is soon fully converted. Or a man will recognize that the laparo-trachelotomy is better and he will do it for the suspect and unclean cases and do the classic in his clean patients. Now, the Editor has never been able to see the logic

(1) Bull. Soc. d'obstét. et de gynéc., March, 1926.

of this argument. The contrary deduction should be made from the premises. If a man admits the low incision, the laparo-trachelotomy, is better as regards mortality and morbidity than the old classic operation in suspect cases it follows that it is also safer for the clean cases, because the qualities which render it safer in the one adhere to it in the other. The slightly greater technical difficulty of the low operation is totally negligible in the presence of the positive elements of security of the laparo-trachelotomy.]

A Suggestion for Drainage in Cesarean Section. Drainage in connection with cesarean sections appealed to S. S. Rosenfeld[2] and he has modified it for the purpose of increasing the benefits to be derived therefrom.

His technic is as follows: The patient is catheterized and the skin of the abdomen is prepared in the usual manner. A median infraumbilical incision is made, the peritoneum is incised, and the abdominal cavity is walled off by laparotomy pads. A hypodermic injection of ½ c.c. of pituitrin is given. The uterus is mesially incised in its lower segment and the baby is delivered either by podalic version, cephalically (2 fingers in the mouth) or by forceps. The placenta is then delivered manually, the uterus tamponed with iodoform gauze and the incision closed in 3 layers, 2 layers of continuous chromic catgut No. 2 for the muscle and a continuous Lembert suture of No. 1 chromic catgut for the visceral peritoneum. A cigarette drain is then placed directly over the wound on the uterus and made to exit at the lower angle of the abdominal incision. The drain is held in position by looping a few interrupted plain catgut No. 0 sutures around it, the sutures passing through the subjacent anterior uterine wall. This catgut is absorbed in from 24 to 48 hours and should it for some reason be necessary to remove the drain, there would probably be no sutures hindering removal after 24 hours.

(2) Am. J. Obst. & Gynec., August, 1926.

Two cases are reported in which this technic was employed, in one of which cultures revealed the presence of hemolytic streptococci at the time of, and subsequent to the operation.

A uterine fistula occurred in the case showing hemolytic streptococci. Undoubtedly numbers of these organisms and infected material escaped through the hole in the uterus, but the tract formed by the uterine drain offered an avenue through which the noxious elements could escape.

Both patients recovered and postpartum examination revealed normal genital organs.

The Treatment of the Third Stage of Labor at Cervical Cesarean Section. In performing classic cesarean section the placenta is usually removed manually soon after delivery of the baby. As a result of this treatment atonic hemorrhages follow in a certain number of cases. The best way to prevent these hemorrhages is to follow the procedure customary in normal labors. However, this is not possible when doing classic cesarean sections, but it can be carried out in the cervical cesarean section. P. Klumper[3] studied the cervical cesarean section cases at the Midwife School in Rotterdam with this point in mind. Since 1916, 100 cervical cesarean sections have been performed. In the early years the placenta was always removed manually. Then the Credé method became the usual procedure. However, since 1922 the placenta has been usually left in the uterus and after the operation has been expressed in the customary way, that is by pressure on the fundus.

In 46 cases the placenta was removed manually and there were 12 cases of mild bleeding, 17 of moderate hemorrhage and 17 of severe hemorrhage. In all of these cases 2 c.c. of an ergot preparation were given before operation. In 33 cases the placenta was expressed by the Credé method and there were 18 cases

(3) Zentralbl. f. Gynäk., Sep. 4, 1926.

of mild bleeding, 8 of moderate hemorrhage and 7 of severe hemorrhage. In these cases also an ergot preparation was given before operation. In the 20 cases where the placenta was left in the uterus no ergot preparation was given and in these cases the bleeding was mild 18 times and moderate twice. From this study the author concludes that the method of treating the placenta has a great influence on the amount of bleeding after cervical cesarean section. Manual removal is not to be recommended. The Credé method is better but the best procedure is to permit the normal separation of the placenta. There must, however, be sufficient dilatation of the cervix to permit the passage of the placenta.

[So they are adopting laparo-trachelotomy in Holland, too!—Ed.]

Cesarean Section after the Test of Labor. The method of performing cesarean section depends upon the stage of labor and the complications present in the individual case. When the operation can be performed before labor begins and the woman is free from infection, a short, high incision with the uterus opened in the abdomen and hooked out with the forefinger will probably remain the operation of choice with the majority of surgeons. [?—Ed.]

The mortality rate should be very low with the classical operation under ideal conditions but ideal conditions are often absent and the mortality rate is not as low as we are led to believe in a study of statistics from some of the well organized clinics throughout the country.

The number of cesarean sections that H. M. Armitage[4] has performed totals 52 at the present time. These represent unselected cases, in a large number of which there had been interference before operation. In the early cases attempts were usually made to deliver the child with instruments, and when it was im-

(4) Surg., Gynec. & Obst., October, 1925.

possible, a cesarean was decided upon. The classical cesarean was performed until 1920 but it was felt that the risk was too great in the class of cases upon which he was called to operate. There were 6 maternal deaths in the whole series, 5 prior to 1920 and 1 death in 31 operations since 1920, when the low cervical operation was first adopted. The one woman who died had had many vaginal examinations, and ruptured membranes, the uterus and contents were infected so badly that a hysterectomy was performed, and she died in the third week from blood infection.

Of the 5 deaths before 1920, 2 were from peritonitis (postmortem examinations were held in both cases), 1 was from hemorrhage from the uterus on the fourteenth day (postmortem examination revealed no peritonitis, a healed uterine wound, and a uterus filled with debris), 1 from eclampsia 2 weeks after operation, and 1 patient died on the table as the skin sutures were being tied. The last death was ascribed to pulmonary embolism although there was no postmortem examination. [Probably bursting of the sutures in the fundus.—Ed.]

Two deaths in 21 cases were directly attributed to peritonitis. Thus it will be seen that the classical cesarean carried a very grave maternal risk in infected or potentially infected cases. The low operation has evidently lowered the mortality, although too few operations have been performed to positively prove this assertion.

The Conduct of Labor After Cesarean Section. A. H. Gladden[5] has been able to collect a small series of 21 cases of subsequent pregnancies following cesarean sections done for other causes than the absolute one of contracted pelvis. Of these, 6 were later delivered by repeated cesarean, with 2 deaths and 15 were allowed to go into labor, 3 of which ruptured with a fatal termination in 2 instances. The other 12 were delivered

(5) Am. J. Obst. & Gynec., May, 1926.

by the vaginal route by breech extraction or mid or low forceps. It is only fair to state, however, that 2 of these cases were admitted after the rupture had taken place and had not been carefully supervised during pregnancy and labor. It is also worthy of note that one of the 12 patients had delivered five times by the natural route since her first delivery by cesarean section.

It seems almost unnecessary to state that any case of former cesarean section should be delivered in hospital, and that no pituitrin should be given before delivery. If the former cesarean was done for contracted pelvis, another abdominal section is indicated. If the first operation, however, was done for other than the absolute cause, the author believes the risk is less if the patient is delivered vaginally than if the cesarean is repeated, particularly in view of the fact that the average mortality rate for this procedure is at least 10 per cent.

The induction of labor with Voorhees' bags two weeks before the expected date of confinement is a wise procedure in many cases. The patient should never be delivered outside of a hospital, the severity of the pains should be controlled by morphia and a general anesthetic as indicated, and mid-forceps should be applied and episiotomy done to relieve the strain of the second stage as soon as possible. It should be emphasized also that these precautions are necessary in every subsequent labor. One successful test of labor by the natural channel does not guarantee the scar against rupture in all following pregnancies.

A Clinical Study of One Hundred and Thirty-Three Pregnancies Following Cesarean Section. K. M. Wilson[7] analyzed the results obtained in all the cases of pregnancy following cesarean section occurring in the Johns Hopkins Hospital for a period of 23 years from 1902 to 1925.

(7) Am. J. Obst. & Gynec., August, 1926.

During the period covered, there were observed 133 pregnancies following cesarean section, these pregnancies occurring in 100 women.

In the entire series, 73 women were observed in a single pregnancy following the original operation, while 21 were observed in 2, and 6 women in 3 pregnancies subsequent to cesarean section.

A high percentage of the women in the series presented varying degrees and types of pelvic deformity. Where marked disproportion was again present in subsequent pregnancies, delivery by cesarean section again became the procedure of choice. In this series the operation was repeated once in 52 instances, while in 15 women it was repeated twice, and in 2 others 3 times. In these 88 operations performed on 69 patients there were 3 maternal deaths, a mortality of 3.4 per cent. Inquiring into the causes of death in these patients, it was found that in one instance it was due to hemorrhage, in another to general peritonitis following a conservative operation done late in the second stage (operation performed 20 years ago) while in the third it was due to general peritonitis following an intestinal injury which occurred on account of dense adhesions between the intestines and the uterine scar of the previous operation. This latter death is one which must be directly attributed to the repeated cesarean section, and the increased difficulty which may attend the procedure on account of the possible presence of dense adhesions.

The formation of adhesions following cesarean section is in the author's experience a very frequent occurrence, and while, as Gamble pointed out, they occur more frequently in those patients who exhibit a febrile puerperium following the operation, yet they are also encountered with an unfortunate frequency in patients who have presented a most satisfactory convalescence. A frequent type of adhesion noted was that of the single rather broad band, extending from the site of

the uterine incision to the anterior abdominal wall. This particular type of adhesion probably does no great harm, but rather may serve as a suspensory ligament to the uterus.

Again, adhesions between the uterus, omentum, peritoneum, and intestines may be quite generalized and very dense. Such a condition naturally adds greatly to the difficulties of a subsequent operation, and incidentally increases its risk. Even the low cervical operation may be followed by this complication. From the above findings it may be seen that repeated cesarean section is not to be regarded as an entirely innocuous procedure.

[Adhesions follow the low cesarean about one-fifth as often as the classic, and they are not as dense, and the Editor knows of only one case where the gut was adherent to the uterus. The rarity of postoperative adhesions is one of the strong arguments for the low or cervical cesarean.]

The results obtained in the case of patients who were delivered by the natural passages, at or near term following one or more cesarean sections, are as follows: This group comprises 29 women, in whom 39 deliveries occurred. In addition, 9 spontaneous labors occurring in this group of women were cared for elsewhere, but in the absence of accurate records they have not been included for consideration in this series.

In the patients under consideration 25 pregnancies terminated spontaneously, 11 were delivered by low or mid forceps operations, and three by version. It is also of interest to note that four women in this group were each delivered three times subsequent to the cesarean section.

When the results obtained in this group are considered, we find that from the maternal standpoint they were uniformly excellent. There were no maternal deaths and no evidence of injury to the uterine scar.

Considering the end-results from the standpoint of the child in this same group, we find that seven children were born dead or died within two weeks, a fetal mortality of 17.9 per cent. This would seem to be an unusually high figure, but on examining the individual records, we find that in only one instance did death occur in a full-term child, all the other deaths being in premature infants weighing less than 2400 gm. at birth.

That most serious of obstetric accidents, rupture of the uterus, occurred three times an incidence of 2.2 per cent.

[2.2 per cent.! Findley gave 3 per cent. Holland, 4 per cent.

In the many thousands of cases of laparo-trachelotomy only ten cases, some doubtful, of rupture of the scar are on record,—and, since this new operation is still on trial, one may rest assured, every case of rupture will be rushed into print. This is another strong argument for the low cesarean.—Ed.]

In the case of women who present a marked degree of pelvic contraction, the treatment in subsequent pregnancies is obviously to repeat the operation, but what should be done in the case of the woman in whom the original operation was performed on account of some temporary indication? If we accept the dictum that all such women should have all subsequent pregnancies terminated by repeated cesarean section, two points have been made fairly obvious in this series: first, that we would perform an unnecessarily large number of cesarean sections, and second, that even then we would be unable to prevent a certain percentage of ruptures from occurring. In support of this latter statement, Wilson directs attention to a patient in the series in whom rupture occurred during the seventh month. Moreover, Findley found in his collected series of 53 cases of ruptured uterus following cesarean section that in 20 per cent. of them the rupture occurred between the seventh and the 8th and a half months of

pregnancy. Nor does the low cervical operation remove the menace, as is indicated by the reports of rupture following this operation which are appearing in the literature.

[See above parenthetical remark, and note also that there is as yet *not a single case of rupture of a uterus after low cesarean during pregnancy.* This is still another argument for the laparo-trachelotomy. The patient is not taken without warning, during pregnancy, in her own home, alone. In the cases of rupture of the cervical scar reported, the women had definite labor pains, most of them for many hours. One woman was left one and one-half hours with tumultuous pains in the second stage; the uterus ruptured with the head visible! Another, with placenta previa in the pregnancy after the section was treated by metreuryse and two pounds traction put on the bag! Only these two women died. The classic cesarean cannot show results in the subsequent labors comparable to these. This argument alone should convert the doubting to the low operation.—Ed.]

Wilson cannot agree with Newell that the risk of rupture is greater than that attending the repeated operation. Expressing the situation in figures, he says that if 100 women delivered by cesarean section on account of some temporary indication, were allowed to go into labor in a subsequent pregnancy, we might expect rupture of the uterine cicatrix to occur in three instances, with one maternal death, a mortality certainly no greater than that attending the repeated cesarean section.

The following suggestions are offered as affording a maximum of safety and prophylaxis to such patients.

1. Patients presenting definite mechanical obstruction; such as a marked degree of pelvic contraction, who have had one pregnancy terminated by cesarean section should have all subsequent pregnancies terminated by the same procedure. In order to reduce to a minimum any possible danger of rupture, the accident

so often occurring at the end of pregnancy or at the beginning of labor, the repeated operation should be an elective one, preferably a week or ten days before the expected date of confinement. It is particularly desirable that such patients should be in a hospital for two weeks prior to the expected date of confinement.

2. In the case of patients who have had 1 pregnancy terminated by cesarean section on account of some temporary indication,—and such patients form an increasingly large group,—the decision as to the procedure to be followed in subsequent pregnancies is more difficult. It would seem, however, that our safest guide at present would be to base the decision upon the character of the puerperium following the original operation. If definite evidence of infection be present, poor healing of the uterine wound is likely with the production of a cicatrix which is poorly adapted to withstand the strain of labor, or even the distension incident to the last weeks of pregnancy. In this group, repeated cesarean section would be the procedure of choice in a subsequent pregnancy, and again this should be carried out as an elective procedure according to the suggestions laid down for the first group. A question that suggests itself in the conduct of the repeated operation in this group is the possibility of completely excising the defective scar, in the hope of obtaining a firm resistant cicatrix.

In those patients in whom the puerperium following the primary operation presented an afebrile course, one may reasonably presume, as shown by Whitridge Williams, that a satisfactory union of the uterine wound has taken place. In this group labor may be allowed to proceed, although realizing that even then an occasional rupture through the scar may take place.

In conclusion, it seems fair to state that the dictum "once a cesarean, always a cesarean" does not necessarily hold true.

Obstetric History of a Woman Who Had Eight Pregnancies After a Cesarean Section. Anderodias and Balard[9] give in detail the history of eight pregnancies which followed a cesarean section. Four of the pregnancies ended prematurely but this case well illustrates that cesarean section does not necessarily limit fecundity. The uterine scar was evidently very strong because in the last delivery the child was extracted with a cranioclast after forceps had failed. The dystocia was caused by a contraction ring in the body of the uterus.

Cesarean Section in the Presence of Edema of the Vulva. Skutsch was able to find only six cases in the literature where cesarean section was performed in the presence of marked edema of the vulva. J. P. Greenhill[1] reports an additional case. The patient was a fat primipara who developed a very acute toxemia. The most conspicuous feature of this case was the unusually marked edema which was generalized. The labia majora, however, showed a striking picture. The right labium majus measured 14 by 8 by 8 cm. and the left one measured 18 by 14 by 12 cm. A cervical cesarean section was decided upon as the quickest and safest procedure. Because of the edema of the labia, catheterization was impossible before operation and was accomplished with great difficulty even under anesthesia. A live baby, weighing 9 pounds, was delivered. The patient made a quick and uneventful recovery and the edema of the labia almost entirely subsided by the fourth day after operation. A second case of cystic edema of the vulva was reported by Greenhill but this patient was not delivered by cesarean section. On admission to the hospital the patient was in a critical condition. Her temperature was 101.5° F., the pulse was 180 per minute and respirations were 60 per minute. In spite of the tachycardia, the blood pressure was 140 mm. systolic

(9) Bull. Soc. d'obstét. et de gynéc., January, 1926.
(1) Zentralbl. f. Gynäk., Nov. 14, 1925.

and 80 mm. diastolic. The baby which presented by the breech was dead. The breech was extracted and the head delivered after craniotomy. This patient recovered less quickly than the first one but the edema of the labia rapidly subsided.

[A case similar to the first reported occurred in the same hospital this year. The patient had several convulsions, and enormous edema of the vulva. A low, cervical section was done under local anesthesia. Death from peritonitis.—Ed.]

Vulvar Eczema and Placenta Previa as an Indication for Cesarean Section. W. Liepmann[2] reports the following case: A para II was admitted to the hospital because of bleeding. During pregnancy an appendectomy had been performed and at the fifth month a weeping eczema appeared on the vulva. This persisted until the end of pregnancy in spite of all therapy. The eczema was so severe that the patient had to remain in bed for the last six weeks of pregnancy. During this time a number of uterine hemorrhages occurred. Labor began spontaneously but prematurely. A smear of the eczematous area showed small, thin streptococci in long chains. Internal examination was therefore not made and a cesarean section of the intraperitoneal cervical type was performed. A complete placenta previa was found. The patient and baby left the hospital in good condition.

[This is a live question,—what to do when it becomes necessary to open the abdomen in the presence of skin infection. The Editor has adopted the following expedients; iodin preparation of the skin, then incision, then sewing a rubber sheet to the edges of the cut; making the incision with a cautery knife (radio knife would be better), then similar protection of the wound. He has tried pre-operative disinfection of the skin by means of alcohol-soap washings, mercurochrome, the

(2) Zentralbl. f. Gynäk., Feb. 13, 1926.

quartz lamp, etc. This would be a good subject for investigation.]

A Live Child Delivered by Cesarean Section Immediately After Maternal Death. According to Weissmann, 331 cesarean sections were performed on dead women during the last century but only six or seven of the children were alive. E. Noltmann[3] reports a case in which he performed a cesarean section on a woman who died suddenly of pulmonary embolism and delivered a live baby which was asphyxiated but which was resuscitated and thrived. Autopsy on the mother revealed a large embolus which blocked both main branches of the pulmonary artery and also thrombosis of the right great saphenous vein. Seven minutes elapsed between the death of the mother and the delivery of the baby and yet the child was asphyxiated. If fetal heart tones are heard after maternal death the indication for cesarean section is easy but not much time should be lost searching for fetal heart tones lest the child die in the meantime. The more sudden the maternal death the better the prognosis for the child. A cesarean section may occasionally save a patient who has an almost fatal cardiac decompensation.

Rupture of the Uterus After Cervical, Transperitoneal Cesarean Section. Since 1916 more than 200 cervical cesarean sections have been performed at the St. Gall (Switzerland) Clinic. Of this number 99 were sterilized at the time of operation, hence there were 101 who could become pregnant after the operation. M. Wetterwald[4] was able to trace all of these patients and he found that 45, or 45 per cent. subsequently became pregnant one or more times. Thirteen of these patients had another cesarean section and in most of these cases no trace of the original scar could be found. Adhesions in the region of the scar were not found. There were 26 women (58 per cent.) who were deliv-

(3) Zentralbl. f. Gynäk., Feb. 13, 1926.
(4) Zentralbl. f. Gynäk., Mar. 6, 1926.

ered through the natural passages after cesarean section. One of these patients had six spontaneous deliveries and another had four. These 26 women had 40 labors *per vaginam*. The third stage of labor was normal in all. Four of the patients received pituitrin during labor with no evil effects for mother or child.

When the placenta is implanted on a uterine scar there is definite risk of rupture. Since there is a 50 per cent. chance that the placenta will be implanted on the anterior wall of the fundus, the classic cesarean section carries a definite risk of rupture of the uterus in a subsequent pregnancy. There is very much less danger from placental implantation in the cervical operation because very few placentas are implanted in the lower uterine segment. However, when a placenta does grow in the lower uterine segment after a transperitoneal section the same risk of rupture occurs as in the classic operation. Nevertheless, this does not mean that the low cervical operation should not be performed for placenta previa. Of the patients in this series upon whom a cervical cesarean section was performed for placenta previa, eight subsequently became pregnant and gave birth through the vagina. One had three labors through the natural passages, hence the presence of the placenta does not interfere with wound healing.

The author reports a case of rupture of the scar following a transperitoneal cesarean section. Rupture occurred during labor five years after the original operation, which was easily performed and which was followed by a normal afebrile convalescence.

From a critical review of the literature the author finds that up to the present time there have been only ten ruptures of the cervix after the cervical transperitoneal cesarean section. The exact number of cervical operations performed is unknown but 3,600 have been reported in the literature. Using this as a basis, there has been one rupture of the uterus for every 360 oper-

ations, an incidence of 0.28 per cent. The incidence of rupture of the uterus after the classic operation varies between 1 and 4 per cent. More important than this incidence is the incidence of rupture of uterus based upon the numbers of subsequent pregnancies and especially labors. Holland in his study found this incidence for the classic cesarean section to be 25 per cent. In Wetterwald's series of transperitoneal operations this incidence was only 3 per cent., a very marked improvement over the classic operation.

[It is a well established fact that rupture of the scar after cervical section is very much less frequent than after the classic operation. There has been no such case published as yet in the United States. The Editor has had several cases of repeated laparo-trachelotomy where labor had been in progress and the scar, though thin, was firm.]

Injury of the Cervix Uteri and Its Intermediate Repair. In a study of 200 recent deliveries by N. H. Williams[5], 86 per cent. of all cases had cervical laceration; 85 per cent. of these were bilateral. The record shows also that 80 per cent. of all primiparae had cervical injury.

Titian Coffey for the past sixteen years has made it his practice to repair the cervix routinely (except in the presence of infection) on the ninth day postpartum. Having had an opportunity of observing his results over a considerable period of time, the author has been convinced that intermediate repair is the proper means of reducing much maternal morbidity and he has therefore, during the past four years routinely repaired all injured cervices on the ninth day postpartum. The technic of the operation is described.

Following the cervical repair the patient is returned to her bed and allowed to sit up against a back-rest, to facilitate drainage. That night and each morning and night thereafter, she is instructed to remain in the

(5) Am. J. Obst. & Gynec., September, 1926.

knee-chest position for periods of five minutes each. The day following the operation she is allowed up in a chair an hour, and each day after the time is increased. She is permitted to walk on the twelfth day postpartum and returns to her home from the hospital on the fourteenth day.

The results of this procedure, both anatomically and subjectively cannot be overestimated. The patients return to the office for their final examinations six weeks after confinement. The cervix is then well healed, scarcely any scar is visible, the os is small and round, admitting only the tip of a uterine sound.

The question arises as to the effect of these repairs upon subsequent labors. In this series there are thirteen cases which had previously been repaired. The average duration of labor in these was eight and one-half hours.

[The Editor repairs all cervical tears immediately after labor. The results have been good, but occasionally perfect union is not obtained. He has not found it necessary to try Coffey's method.]

The Reaction of the Tissues to Radium in Treatment of Cancer of the Cervix, and the Importance of Lacerations in Producing Cancer in This Location. L. K. P. Farrar* has been impressed by the frequency with which lacerations were present in the cervix in cases of carcinoma, and decided to study 300 consecutive case histories of cancer of the cervix to determine the incidence of pregnancy in this series of cases. In 288 of the 300 cases or 96 per cent., pregnancy (i.e. children or miscarriages), had occurred, leaving only 12 cases or 4 per cent. who had never been pregnant.

It seems thus that repeated traumatization by labor or miscarriage might be a factor in changes terminating in carcinoma. Mention was made in nearly all the histories of hard labors or instrumental deliveries, and the specific statement was frequently met that the patient

(*) Am. J. Obst. & Gynec., October, 1926.

had been "badly torn" and "not repaired." In only nine instances in the 288 cases that had borne children was it recorded that "lacerations" were repaired and in six cases the repair had been made after the first delivery and no repair noted as having been made after the birth of the next child. In no instance was it specifically stated that the "repair" of laceration mentioned meant that the cervix itself was repaired.

In more than one-tenth of the series of 300 cases, cancer of the cervix had occurred less than five years after the last pregnancy, and in more than one-fifth of the series, cancer had occurred less than ten years after the last pregnancy.

The result of severe or repeated injuries in the cervical canal may be seen in the erosion or eversion of the lips of the cervix and in the cystic changes which take place in the glands themselves. Similar changes in the tissues elsewhere in the body are looked upon by pathologists as having an important bearing in the development of cancer. Should we not expect to find cancer developing in the cervix when similar conditions are present there as produce cancer in other locations? It seems only logical to ask why not repair the lacerations early? Much is being done medically in prenatal work to put the expectant mother in the best possible condition and so safeguard her for the labor, but are we giving sufficient surgical attention to postnatal conditions and especially to the injuries present after the delivery in the birth canal?

With the increasing percentage of cancer of the cervix is it not possible to lessen the menace of this terrible disease by turning back to the teachings of fifty years ago? Inspect the cervix of the recent mother and then employ a technic so simple that when performed soon after the injury has occurred it will restore the tissues to normal.

Sterilization By Crushing the Tubes. In 1919 N. Madlener† reported 89 cases in which he performed

(†) Zentralbl. f. Gynäk., Jan. 23, 1926.

sterilization by crushing the fallopian tubes and not one of these patients subsequently became pregnant. The method is as follows: the tube is grasped in the middle with a clamp, pulled upward and bent on itself. The tube with its mesosalpinx is crushed with a clamp and the furrow thus made is tied with a permanent ligature. The author reports 39 additional cases with equally good results. Waser from the Zurich clinic reported 225 cases with no subsequent pregnancy. In the author's series this method of sterilization was performed through the vagina 75 times, mostly during operations for extensive prolapse of the uterus. In not one of the cases has a pregnancy, either intra- or extra-uterine, occurred.

[In 1920 the Editor performed this operation following a cesarean section for heart disease. Sterilization was done thus to save time,—but where such a therapy is necessary, it would usually be better to exsect a portion of the tube and bury the ends in the folds of the broad ligament.—Ed.]

Uterine Hemorrhage

Treatment of Placenta Previa Based on a Study of 303 Consecutive Cases at the Boston Lying-in Hospital. In 1921 F. S. Kellogg[6] reported a reduction in maternal mortality in placenta previa at the Boston Lying-in Hospital for the years 1915-1920 over previous years. This improvement was from 19 per cent. in 1895-1915, to 6 per cent. in 1915-1920, and was attributed to marked increase in treatment by conservative methods, the use of the Voorhees' bag and bipolar version, as against manual dilatation and immediate extraction.

The next five-year period ended and was studied. The author hoped to demonstrate conclusively that conservative delivery from below is the best method

(6) Am. J. Obst. & Gynec., February, 1926.

of treating placenta previa. These expectations were not realized. True, 76 per cent. of the previas had been delivered conservatively from below, but the maternal mortality had risen from 6 per cent. to 10.5 per cent. In complete previas it had risen from 18 per cent. to 25 per cent. The fetal mortality had risen somewhat. The combined mortality in 151 cases by conservative treatment was 8.25 per cent. as against 19 per cent. in 152 cases delivered by radical manual dilatation and immediate extraction. The only honest conclusion the author could draw was that conservative delivery from below is more than twice as safe for the mother as accouchement forcé in placenta previa.

[Thank heaven, "accouchement forcé" is dead.—Ed.]

He calls attention to eight considerations bearing on treatment which have arisen as a result of this study. These are:

1. The "Typical Placenta Previa Death." Briefly described it is as follows: Delivery is accomplished, the placenta out, ergot and pituitrin given, fundus held, cervix pulled down with hooks, inspected, found intact or laceration repaired to top, fundus, cervix and vagina packed or not as you choose, transfusion or not as indicated, patient in fair or good shape, prognosis good barring sepsis. One-half to three hours later, bleeding, rising pulse or lower pressure, softening fundus; re-examine, intact cervical ring, pack or unpack, ergot and pituitrin, transfuse or retransfuse—consider hysterectomy, condition too poor, sudden persistent softening of whole uterus, death.

2. There are a certain number of previas in which no method of delivery from below, either natural or artificial, will fail to rupture the lower segment in one way or another, open or concealed. In this group a part of the lower segment is so invaded by placental tissue or so thinned out that it cannot fail to rupture if the fetal head comes through it.

3. The third consideration involves a critical discussion of the theory of bipolar version and the use of the Voorhees' bag in the treatment of placenta previa. The advocates of these methods of treatment have insisted that bad results come because the attendant would not wait for the bag to dilate completely, or would insist on pulling the baby, gently of course, through the partially dilated cervix rather than wait for nature to push it through as the true Braxton Hicks' procedure calls for. Two years ago the author agreed with this; now he doubts whether it is always true, though he still believes it too often is.

[Sometimes the pains or the bearing down efforts of the woman (which she can't control), force the child through too quickly.—Ed.]

4. Practically half of the women who died probably died of ruptured lower segment, concealed or open. If the bulk had not died of hemorrhage or ruptured uterus or both, on the law of averages four or five more would have died of sepsis in one form or another.

5. The maternal mortality rate in the complete previas for fifteen years, by five year periods, has run 36 per cent., 18 per cent., 25 per cent.—the last two figures under the most conservative treatment from below. The author is open-minded about these figures and only asks, could they possibly be worse under any other method of treatment?

6. Infant mortality. Kellogg taught for many years that the baby in toxemias with convulsions and in placenta previa is a by-product. If you save it, so much the better; if you do not and save the mother, you should be satisfied. He still believes this in principle but he is questioning whether in placenta previa, by sacrificing the baby we are so often saving the mother *per se.* Of 85 babies, 23 died who might have lived if they had not been subjected to delivery from below.

7. A seventh consideration is a minor one, yet it has contributed to fatal outcome. The multiparous women in whom placenta previa is most frequent are prone to vulval and vaginal varicosities. It is disconcerting to observe the difficulty of controlling bleeding from these if extensively ruptured by the head,—while a torn cervix bleeds simultaneously.

8. Barring Germany, where very low maternal mortality is reported from bipolar version, and where, oddly enough in the face of this, there is the most enthusiasm for section in the treatment of previa, the author's statistics compare favorably with others or are much the same in similar institutions. To illustrate with but one example in a reasonably long series of cases: New York Lying-in Hospital, 591 cases, maternal mortality 12.1 per cent., stillbirth incidence 42 per cent. Treatment chiefly gauze packing followed by internal podalic version (R. McPherson). Kosmak reports from the same institution another series with 14 per cent. maternal mortality, stillbirth rate 62 per cent.

The author concludes that in spite of previously held opinions, and in the face of the opinions now held by those for whose obstetrical judgment he has the most regard, he is forced by this study to these beliefs:

That all central and partial previas are best treated by low abdominal cesarean section, whether the baby be viable or nonviable, living or dead.

That marginal placenta previa is best treated by Voorhees' bag induction.

That moribund or very sick patients with placenta previa should be rested, bleeding controlled by necessary methods, including tight cervical and vaginal pack and pressure over and above the fundus; transfused, operated on as above on pulse and pulse pressure reaction, and retransfused. It should always be the effort to ascertain as nearly as possible how much blood has been lost and to replace that amount as

nearly as possible. The author thinks direct transfusion probably better than citrated blood if time, apparatus, and knowledge of technic permit. If there is any question of these things, the simple citrate transfusion should be used immediately, since unquestionably a quick well done citrate transfusion is superior to a botched direct transfusion.

Further, he believes that hysterectomy following section should be frequently practiced, each case to be considered by itself on the following grounds: risk of sepsis from previous history, persistent bleeding following the section, and number of dependent children at home. If a woman has several as is usually the case, and hysterectomy seems to improve her chances, it should unhesitatingly be done.

[The Editor agrees with the opinions expressed by Kellogg.]

Placenta Previa in Karlsruhe from 1893 to 1923. Among 19,027 labors there were 172 cases of placenta previa (0.9 per cent.), which were studied by H. Wagner[7]. Only 19 patients were primiparas and 100 patients had more than three children. Only 72 cases were at term, among which only 40 children were born alive. The entire fetal mortality was 52.9 per cent. The total mortality of the mothers was 9.3 per cent., of which 8.1 per cent. was due to hemorrhage and 1.1 per cent. to sepsis. The morbidity was 22 per cent. There was no mortality for 29 patients who had spontaneous deliveries but there was a morbidity of 17.2 per cent. In the early years tamponade was used and the mortality from hemorrhage was 16.6 per cent. The incidence of fever in the patients who were tamponed was twice as high as in those not packed. Among 71 cases of version, delivery of the child was left to nature after bringing down a leg in 31 cases and 83.3 per cent. of these children died. In the cases where manual extraction was performed the fetal mortality was 65 per

(7) Ztschr. f. Geburts. u. Gynäk., 1926, Vol. 89.

cent. The bag was used in 49 cases and the maternal mortality was 11.1 per cent. In 18 cases cesarean section was performed and there was 1 death (5.5 per cent.). The fetal mortality was 22.2 per cent. Until now cesarean section has been performed for central placenta previa but the author believes this operation should be used in cases of lateral placenta previa also. Even where the child is dead cesarean section should be performed in the interest of the mother.

The Therapy of Placenta Previa in a Hospital. The feeling that the treatment of placenta previa should be transferred from the hands of general practitioners to a hospital is gaining ground constantly.

Siegel[8] performs abdominal cesarean section for all cases of placenta previa and in nine such operations, not one case of which was aseptic, there was no mortality for mother or baby. In addition he collected case reports of 528 abdominal cesarean sections performed for placenta previa and found the mortality to be 6.3 per cent. The fetal mortality for the viable children was 6.8 per cent. The author compares these results with other published statistics and gives the following table:

		Mortality	
	No. of	*Mater-*	*Fetal*
General Practice	*Cases*	*nal*	*(Viable)*
Statistics of Bavaria (v. Seuffert) ..	8729	19.0	49.3
Hospitals			
Combined version (Schweitzer)	1266	5.4	79.4
Colpeurynter (Schweitzer)	670	5.8	27.6
Vaginal cesarean section (Döderlein)	159	8.2	17.0
Abdominal cesarean section (Siegel)	528	6.3	6.8

In Germany the number of advocates of cesarean section for the treatment of placenta previa has recently advanced considerably. Not only are the clean cases of placenta previa now treated by abdominal operation but also those in which examinations were made without regard to asepsis. The author advocates

(8) Monatschr. f. Geburtsh. u. Gynäk., April, 1926.

abdominal cesarean section for placenta previa in every case which has advanced beyond the thirty-second week regardless of whether the child is dead or alive, to avoid danger to the mother. The danger consists in laceration and lack of retraction of the isthmus and these can occur whether the fetus is dead or alive. The transperitoneal cervical operation is the one of choice because it can be used in both clean and suspicious cases.

Abdominal cesarean section gives the same results for the mother as the other methods of treatment but it gives the best results for the baby, hence it should be the method of choice. In definitely infected cases conservative therapy should be practiced or cesarean section followed by hysterectomy. Physicians should be made to realize that when a patient has a hemorrhage near the end of pregnancy it is dangerous to make an internal examination both because of the likelihood of more bleeding and because of the danger of infection. Furthermore, the diagnosis of placenta previa can usually be made without any examination. Patients who bleed should be sent to a hospital without delay and should not be tamponed.

An Analysis of Seventy-Nine Cases of Placenta Previa. It is the purpose of this paper by B. L. Lieberman[9], to present an analytic study of a series of cases of placenta previa as they occurred in a general hospital, where the obstetric work is done largely by general practitioners and a staff of three specialists.

During the last five years there was a total of 7,928 women delivered, among whom there occurred 79 cases of placenta previa or a very small fraction over 1 per cent. of the total. The total fetal mortality was 64.55 per cent. Eleven mothers died,—or 13.79 per cent. In 9 of the 11 deaths version and extraction had been done. Lieberman recommends the bag followed by version.

(9) Am. J. Obst. & Gynec., June, 1926.

Studies on the Experimental Production of Premature Separation of the Placenta. A Preliminary Communication. Couvelaire and Williams were the first to direct attention to the fact that, in severe cases of abruptio placentae at least, the condition is accompanied by characteristic lesions. The uterus assumes a peculiar, coppery, metallic appearance and sometimes presents fissures on its peritoneal surface, while the broad ligament and occasionally the tubes and ovaries are engorged with blood. Upon histological examination the uterine lesion consists in intramuscular hemorrhage, which leads to disassociation of the muscle fibers and which is due to damage to the walls of veins of small and moderate calibre, while outside of the hemorrhagic areas the connective tissue is spread apart by edema.

When one takes into consideration the hemorrhagic lesions associated with the condition, and furthermore recalls the fact that the shock is frequently out of proportion to the amount of blood lost and that the blood pressure is markedly lowered, one inevitably calls to mind the well-known picture of experimental histamin-intoxication.

Experiments by J. Hofbauer and E. M. K. Geiling[1] were conducted upon ten guinea-pigs and four cats, and, with the exception of chloralose in one instance, no anesthesia was employed. Histamin was given intravenously or intracardially in the dilution of 1:1000 down to 1:3000 per kilo of body-weight. By way of control, two other animals were injected with histamin-free peptone.

Immediately a striking gross result was obtained, the uterus going into tetanic contraction, its vessels, as well as those of the broad ligament, becoming immensely engorged, while the animal passed into a condition of shock with a marked fall in blood pressure.

Upon histological examination, the invariable result

(1) Bull. Johns Hopkins Hosp., February, 1926.

in guinea-pigs was that in different places the fastening plasmodial roots had become detached to a greater or lesser extent and hemorrhage had separated in part the placenta from its basal tissue. In the cat the placenta did not show signs of separation, but in this connection it must be borne in mind that its structure differs entirely from that encountered in the human placenta. Moreover, a noteworthy phenomenon was observed in the uterine mucosa in this series of experiments, namely, a conspicuous hemorrhage extending along the course of the blood-vessels, while the uterine glands adjacent to the placenta were filled with fresh blood, which in places lifted up the epithelial covering of the uterine mucosa. Within the uterine wall the occurrence of a marked edema, spreading apart the muscle bundles, was a striking feature. In the guinea-pig, as well as in the cat, the occurrence of thrombi in the veins of the decidua and of other organs, especially the liver, could be demonstrated. In some of the experiments the abdominal cavity contained a variable amount of free fluid, which was highly conspicuous in a few instances.

The changes encountered in the livers of the cats aroused special interest, peripheral necrosis and stagnation of the bile being the most prominent features. Since marked degenerative changes occurred in the epithelium of the convoluted tubules of the kidney, the above observations bear a striking similarity to the characteristic lesions occurring in both organs in eclamptic patients.

The results obtained are in harmony with the recent tendency pointing to the association of premature separation of the placenta with a toxemic process, and indicate that a sudden access of histamin to the circulation of the pregnant woman might well account for the sudden appearance of the accident in question with its train of alarming symptoms.

Abruptio Placentae and Uteroplacental Apoplexy. It is pointed out by J. P. Greenhill[2] that the occurrence of premature separation of the normally implanted placenta, variously known as abruptio placentae (DeLee), ablatio placentae (Holmes), and accidental hemorrhage (Rigby), is much more common than most physicians realize. Most individuals associate abruptio placentae with a tragic condition which frequently ends fatally for mother and child. These are usually instances of complete separation of the placenta associated with shock. However, there are many cases of partial abruptio which are so mild that they have little effect on the mother, but they frequently cause the death of the fetus. When we include the latter cases in our statistics we find that abruptio placenta is at least as common as placenta previa. For example, at the Chicago Lying-in Hospital, in a period of seven years, among 24,451 obstetric patients there were 70 cases of placenta previa, but there were 82 cases of abruptio placentae. Only 1 of the 70 patients with placenta previa died (1.3 per cent.), while 3 of the 82 women with abruptio died (3.6 per cent.).

Uteroplacental apoplexy is the name given by Couvelaire to a severe form of abruptio placentae which is associated with changes in the uterine wall and in some cases with changes also in the adjoining structures. The uterus which shows utero-placental apoplexy has a purplish blue metallic color. Histologically one finds small intramuscular hemorrhages about the periphery of the small veins in the uterine wall. These hemorrhages are more marked in the outer portion of the uterine wall, and hence militate against the theory that the blood originated in the cavity of the uterus and was forced into the uterine musculature because of increased intrauterine pressure. The hemorrhage which initiates the separation of the placenta usually begins in the decidua, but may begin in the depth of

(2) Surg. Clin. North America, August, 1926.

the placenta. Hemorrhages are often not limited to the uterus, but may be found in the broad ligaments, the tubes, and the ovaries.

The diagnosis of uteroplacental apoplexy can only be made at operation or at autopsy. When found at operation, hysterectomy is nearly always necessitated because the uterus usually fails to contract after its contents are removed.

Greenhill selected three cases because they are interesting examples of abruptio placentae and because they represent three different types of etiology. One is a case of uteroplacental apoplexy.

In the first case the abruptio occurred after the spontaneous delivery of the first baby of twins. The etiology in this case was most likely the sudden release of a large amount of liquor amnii when the second bag of waters was ruptured artificially. At no time during pregnancy had there been any signs or symptoms of toxemia. The blood pressure just before delivery was 130 mm. systolic and 85 mm. diastolic and the urine was negative. Almost all the hemorrhage in this case was concealed inside the uterus, for the amount of external bleeding was very slight and consisted essentially of serum (from the blood-clots in the uterus). This is unusual because the inlet was not completely blocked by the fetal head or breech. The presenting part was a shoulder. Delivery was accomplished by version and extraction because the cervix was completely effaced and dilated and because there was a shoulder presentation. The abruption of the placenta was complete and the baby was, of course, dead.

In the second case the abruption of the placenta was associated with an acute and severe toxemia, namely, eclampsia. The latter developed rapidly in spite of good prenatal care. The separation of the placenta was partial and was first noticed after the patient had had two convulsions. In this case there was blood not

only in the uterine cavity but also in the urine and in the peritoneal cavity.

Eclampsia alone is very grave, and so is abruptio placentae but the combination is extremely serious. The only chance of delivering a live baby was by cesarean section and the author had to hurry because the heart tones were very slow and somewhat irregular before the operation.

The third case was one of uteroplacental apoplexy and is very interesting for a number of reasons, the chief of which is the relationship between an automobile accident which occurred while the patient was on her way to the hospital and the uteroplacental apoplexy. Most individuals would unhesitatingly say that the trauma caused the pathologic condition in this case because one followed the other so quickly. However, a few obstetricians deny the rôle of injury in the causation of abruptio placentae. These obstetricians would claim that in the present case the separation of the placenta would have occurred without the accident and that the injury was simply an exciting cause. This patient had no signs or symptoms of toxemia, hence toxemia cannot be held responsible.

The uterus was markedly dextrorotated but this in all likelihood had nothing to do with the abruption of the placenta. Experimentally, however, Morse was able to produce hemorrhagic lesions in the uterus by means of excessive rotation which interfered with the circulation of the blood.

Rigor mortis was present in the baby and is interesting because of its comparative rarity and because it might have caused trouble if delivery had been attempted per vaginam.

The question of treatment is important. Was the author justified first in performing a laparotomy, and second, in removing the uterus? A laparotomy was performed because the patient was in critical condition due to the bleeding which was going on in the uterus

and because the cervix was thick and dilated only 2 cm. Furthermore, there was a possibility of a partial rupture of the uterus. If delivery had been attempted from below, it would have necessitated a rapid manual dilatation of the cervix (which nearly always tears the cervix) or a vaginal cesarean section followed by version and extraction or by craniotomy. Version and extraction would most likely not have been attempted because the baby was dead, but had such an attempt been made, it would have been very difficult because of the rigor mortis of the fetus. Furthermore, for these forms of delivery from below an inhalation anesthesia would have been necessary and this ordinarily adds to the danger of any operation. Whenever possible an inhalation anesthetic is avoided for many reasons, among them being a desire to decrease the incidence of postoperative pneumonia. Nevertheless, the patient in this instance developed pneumonia within a short time after delivery in spite of the fact novocain except for the difficult delivery of the child, when a few whiffs of ethylene were given.

In this patient the uterus showed the condition of uteroplacental apoplexy and it remained flabby after its contents were emptied even after the hypodermics of pituitrin and ergot. Furthermore, there was a hematoma in the left broad ligament with the likelihood of a partial rupture of the uterus. The author did not hesitate to remove the uterus for the reasons just mentioned.

In performing a cesarean section in a case of uteroplacental apoplexy the incision in the uterus should be made in the lower uterine segment because this portion is usually free from the disease. For the same reason when a hysterectomy is necessary, the lower uterine segment should be left.

Ablatio Placentae. In the past five years, W. E. Welz[3] has seen nine cases of the severe toxic type of

(3) Am. J. Obst. & Gynec., June, 1926.

abruptio placentae. The fetal mortality was 100 per cent. The maternal mortality was 6 (66 per cent.). Of these, six were delivered from below and the usual means of combating hemorrhage were followed, *i.e.*, packing, ergot, pituitrin, suturing the cervix. Five of these died, a mortality rate for this method of care for this type of 83 per cent. Two women of the three who had Porro sections performed made uneventful recoveries, though recuperation was slow due to exsanguination and toxemia; one died from exsanguination.

Of the less severe toxic type, the author has seen seven cases in the same period. The fetal mortality was 100 per cent. and no maternal mortality. Eight cases which illustrate the various types of ablatio placentae are reported.

The author believes that very few cases of abruptio placentae are of the traumatic type. These are not so dangerous as the toxic type and can be delivered by the natural birth route. The toxic type is more frequent and more dangerous. The most dangerous of the toxic type are those in which intramuscular hemorrhages occur. These are diagnosed by the tenseness and tenderness of the uterus, together with uncontrollable hemorrhages and shock. Porro section appears to be the only successful method of disposing of this type. The less dangerous toxic type is the one in which there are placental hemorrhages with hematoma formation. As the uterine musculature is not involved in hemorrhage, it is capable of contracting after being emptied. This type may be delivered through the birth canal. Following delivery uterine stimulants and packing will control hemorrhage. In this type the uterus is not tense or tender but lax before delivery.

A Revised Conception of Antepartum Accidental Hemorrhage. In this paper G. FitzGibbon[4] reviews his work during six years to point out the characters in

(4) J. Obst. & Gynec. Brit. Emp., 1926, Vol. 33, No. 2.

cases that appeared to him incompatible with the generally accepted views, and to express the opinion he has formed of the disease.

First.—Accidental hemorrhage has been divided into two main types—revealed and concealed. The occurrence of these two types was explained by the fact that in the revealed type the uterine muscle was healthy, and therefore resisted distention by blood poured into the cavity of the uterus, while the concealed type was due to disease of the muscle which made it unresponsive to stimulation and allowed it to passively distend. This fact the author found to be absolutely inacceptable in view of the behavior of the uterus in the vast majority of cases.

Second.—Although the fact is disputed to some extent, it is the more commonly accepted view that accidental hemorrhage is due to toxemia. The author fully accepts this view but he found that although primigravidae suffer from the other toxemic diseases twice as frequently as multiparae, the latter supplied at least 85 per cent. of the accidental hemorrhages, and more than half of the cases were advanced multiparae.

Third.—Of recent years it has been suggested that the toxemia is the result of extravasated blood and due to the reabsorption of byproducts. This does not appear a tenable proposition in view of the many other conditions leading to extravasation of blood and without toxemic symptoms, such as ruptured ectopic pregnancy and hematoma.

Fourth.—The results from various treatments are not consistent with the supposed condition of the uterine muscle and FitzGibbon refers to the treatment accredited to the Rotunda Hospital "vaginal plugging." Tweedy advocated this treatment, and expounded views as to how the bleeding was controlled by the plug. He demonstrated that a vaginal plug controlled the circulation in the uterine arteries, and that unquestionably bleeding did not continue after the plug was placed,

but it has never been shown how the bleeding is stopped in view of the fact that the circulation through the ovarian arteries is not controlled and anyone who has performed hysterectomy at term will admit that the ovarian supply is as great as the uterine.

Fifth.—Hysterectomy had been adopted as the treatment in a few cases, then cesarean section was substituted and the uterus was found to act perfectly although hysterectomy was adopted on account of the supposed degenerated state of the muscle. Neither operation appears to the author to be justified by the results obtained when compared with other treatments.

The author has gone through the records of the Rotunda Hospital for the nine years preceding his Mastership—1910-11 to 1918-19. During this time plugging was the principal treatment adopted: cesarean section and hysterectomy were resorted to in some cases. In the hospital 51 cases are reported with 8 deaths; these cases were treated by plugging, with 2 deaths; 4 cases were treated by cesarean section with 1 death; 3 cases were treated by hysterectomy with 2 deaths; the remaining 28 cases were treated palliatively, with 3 deaths. From palliative treatment the mortality was 10.7 per cent.; from plugging, 12.5 per cent.; from cesarean section, 25 per cent.; and from hysterectomy, 66 per cent.

Of the 51 cases only 7 were primiparae, and only 1 primipara died.

From a study of these cases the author does not think the claim is established that any case of accidental hemorrhage is benefited by cesarean section, hysterectomy or other operative interference, that would not get well by careful, expectant treatment. Further, there do not appear to be any definitely diagnostic symptoms by which the cases can be classified for treatment. It was owing to these conclusions that he abandoned operative treatment, including plugging,

shortly after he was appointed in charge of the Rotunda.

He now records his own statistics during the past six years: in the Intern, 64 cases, with 3 deaths; in the Extern, 34 cases with 4 deaths.

Comparing the whole results in the two series, it is better to avoid percentages. The cases may be looked upon as of the same type and severity. First series: Nine years, 33,000 confinements, 8 deaths for 1 year, unit 8. Second series: Six years, 22,000 confinements, 3 deaths corrected to 9 years, unit 4½.

There is a markedly greater incidence of the complication among multiparae than primiparae. In the Rotunda, out of 115 cases, 99 were multiparae and 16 primiparae. This is a very remarkable difference to what is found in eclampsia in which the relative figures are 30 to 70. The author fully accepts the view that accidental hemorrhage is largely due to a toxemia but with the above facts it must be a different toxemia from that producing eclampsia, or there must be some factor existing in multiparae or produced by multiparity which alters the effect of the toxemia. To investigate this he kept careful notes of the presence of albumin in the urine of his last 46 cases. Six cases were primiarae, and in five the urine boiled solid. In one case there was no albumin. Forty cases were multiparae; in five the urine boiled solid, and in 21 there was a marked amount of albumin; in eight there was only a slight trace, and in six there was "no albumin."

The author formulates the views he holds at present, as follows: There are two types of ante-partum accidental hemorrhage: (1) a simple and truly accidental ablation of part of the placenta; (2) a toxemic condition due to hematoma or apoplexy of the uterine wall, involving the placental site in common with the rest of the uterine wall, but not originating in the placental site. The two conditions are totally unconnected and must be considered separately.

Simple accidental ablation of the placenta. There are many distinct causes of the condition: (1) low implantation of the placenta, so that it encroaches on the lower uterine segment; this is a not uncommon cause. The incidence is similar to placenta previa, but as the placenta cannot be reached the cases cannot be diagnosed as previa. The only symptom is external bleeding and the blood coagulates after collection in the vagina. The fetus is not affected, and the maternal health is good. There is usually persistence of bleeding in small quantity or intermittently. This may lead to a progressive anemia and require termination of the pregnancy. The pregnancy can be terminated safely by any of the recognized slow methods of induction of labor. As the ablation of the placenta is only likely to occur in these cases near term the infant is always alive and healthy. (2) Ablation of a normally situated placenta, an uncommon cause, but one which may occur any time in the last months of pregnancy. Injury, such as falls or sudden violent action of the abdominal muscles to prevent falls, may be the cause. The bleeding may be revealed, combined or concealed.

The patient does not show symptoms except the discharge of the serum and the fetus is alive, its condition depending upon the period of pregnancy. (3) During labor some condition may cause traction on the cord, and this ablates the placenta. The bleeding is usually revealed, and comes away as fluid blood or clots from the vagina.

Toxemic ante-partum hemorrhage; hematoma or apoplexy of the uterus.—In this type the condition of the uterus is that described in those cases submitted to laparotomy or found at autopsy.

Etiology.—Ninety per cent. of the patients are multiparae, most of them advanced multiparae. Evidently the condition is something promoted by repeated childbearing and associated with nephritis. The author believes in the multipara the cause is a chronic inter-

stitial nephritis. The degeneration of the uterus is in the connective-tissue between the muscle fibers, and is exactly comparable with the degeneration in other parts of the body in chronic nephritis, such as occur in the brain. This results in a slow but persistent extravasation of blood into the connective-tissue and a concomitant oozing of blood into the uterine cavity. The degeneration occurs all over the uterus, under the peritoneum in the decidua both at and outside the placental site. The progressive destruction of the placental site results in the slow death of the fetus and this probably always precedes the occurrence of symptoms by several days.

Treatment.—If the fetus is alive the patient is treated on purely palliative lines and watched. If albumin is present she is watched with a little more care. The occasional cases of persistent, fresh bleeding may call for induction of labor after several days. The other cases clear up or end in uneventful delivery. Those patients showing toxemic symptoms and in labor are allowed to complete delivery as a rule without interference but if the uterus is tense or painful, the membranes are punctured, the patient is kept warm with hot bottles and given water to drink freely.

If the patient is in profound collapse and without evidence of labor, the membranes are punctured and restoration aimed at. The puncture of the membranes results in the onset of labor and the termination of the pregnancy when the condition of the patient is restored. The patient, no matter how she improves or what her condition was at the onset, is not allowed to continue her pregnancy if the fetus is dead. Labor is induced when she is well restored, by a slow process or by rupture of the membranes and sometimes by the bringing down of a leg. There is no excuse for any form of extraction since the fetus is always small and the patient generally a multipara. The author has never seen the least indication of post-partum hemor-

rhage even in profound cases, but the uterus is always carefully controlled and stimulated by massage.

[After some more years of experience the author will probably see some indication of post-partum hemorrhage. —Ed.]

Plugging the Vagina.—This treatment was instituted in the Rotunda and is erroneously described as the routine in all cases. It was largely practised—16 times in 51 cases, with 2 deaths. The author personally never could accept Tweedy's theory that it controlled bleeding by compressing the uterine arteries,—that does not influence the ovarian supply.

Cesarean Section.—This is the last treatment referred to. It is being advocated in the present day by high authorities, and the author considers on totally wrong lines, for a rapid and persistent bleeding that must be stopped. A patient in profound collapse is not in a condition to stand a laparotomy, while the inevitable disturbance in the preparation for operation postpones recovery, if it does not increase the collapse. Results from cesarean hysterectomy are worse than those from any other treatment, even accouchement forcé by version or forceps.

[The Editor holds slightly differing views regarding the treatment of abruption of the placenta. If the diagnosis is made while the child is still alive a rapid cesarean section, or perhaps laparo-trachelotomy will probably save both patients. If the abruption is complete, the child dead, the woman having pains and no alarming symptoms present, one may sit by and watch. Small doses of pituitrin at first dropped under tongue, and if no effect, by hypodermic needle,—Beck's abdominal binder or the Spanish windlass compression of the uterus, and all needful fortifying and restorative measures being applied. If in spite of these the condition of the patient declines and labor makes no progress one should either do a laparo-trachelotomy or hasten the delivery by means of a metreurynter, or any mea-

sure that best meets the local conditions. In extreme shock a blood transfusion is the first aid, then abdominal delivery or one of the slow methods of delivery from below,—puncture of the membranes, the metreurynter, version and extraction, craniotomy, depending on the conditions.]

Late Hemorrhages After Labor and Abortion. Kermauner recently divided the causes of late hemorrhages postpartum into four groups as follows: (1) placental remains; (2) general infections; (3) aneurysms; and (4) subinvolution of the blood vessels in the mucosa. O. Frankl[5] discusses the last named cause because he is convinced that it is responsible for many hemorrhages not only post-partum but also post-abortum. He studied the material at his command during the last seventeen years and found 460 cases in which, because of hemorrhage after labor or abortion, the uterus was invaded and material was obtained for examination by curettement, digital removal or hysterectomy. Only those cases were included where bleeding occurred at least one week post-partum or post-abortum. There remained only 155 cases where the only material obtained was decidual tissue without villi. Among these 155 cases the decidual remains showed inflammatory changes 73 times. Two types of tissue were obtained. In the first the tissue usually showed hyaline degeneration with or without inflammation. The areas of hyaline degeneration varied considerably in size and number but within them were found blood vessel lumina, some of very great size. The blood vessels contained partly fluid and partly coagulated blood. The hemorrhages which occurred in these cases is explained by the proximity of these blood vessels to the surface of the mucosa. In the second type the blood vessels were surrounded by a hyaline ring which did or did not contain decidual cells. From a study of the duration of pregnancy in 104 of the 155 cases,

(5) Arch. f. Gynäk., 1926, Vol. 129.

it was found that in the second month of pregnancy most cases of late hemorrhage occurred and the latter never occurred between the fifth and tenth months. The late hemorrhages are the result of large blood sinuses, the involution of which is prevented by the rigidity of the surrounding hyaline degenerated tissue. Inflammation may play a rôle. A striking thing is that in many of the cases there was a history of numerous births or abortions and many of the patients were advanced in years.

The Treatment of the Third Stage of Labor with Special Consideration of the Question of Removal of Retained Pieces of Placenta. A critical analysis of the cases seen at the Second Budapest Clinic during the last 25 years is made by A. Haba[6]. Altogether there were 32,323 labor cases and the uterus was invaded 107 times for pieces of placental tissue which remained in the uterus. The analysis leads the author to conclude that exploration of the uterus immediately after labor is not as serious a procedure as it is during the puerperium. Hence in every case where it is suspected that pieces of placenta remain in the uterus the latter should be explored immediately. If fever arises during the puerperium in a patient who has some placental tissue still in the uterus, the latter should be invaded only for a vital indication, such as serious hemorrhage. In febrile cases without much hemorrhage an attempt should be made to cause the expulsion of the placental remains by means of oxytocics. If the uterus must be explored, only the finger should be used and only those cases should be explored where the infection has not extended beyond the uterus.—[O. K.—Ed.]

The Danger of Manual Removal of the Placenta with Special Reference to the Aorta Compressor. Among 15,100 labor cases at the Bochum Clinic the placenta was removed manually 147 times, an incidence of 0.97 per cent. In these 147 cases the puerperium was febrile

(6) Arch. f. Gynäk., 1926., Vol. 127.

in 30.6 per cent. and the mortality was 4.76 per cent. An analysis of these cases leads A. Montag[7] to believe that manual removal of the placenta in uncomplicated cases without fever, when performed under aseptic precautions, is a relatively harmless procedure. However, in clean cases there is some danger because of the possibility of embolism. In cases complicated by intrapartum fever and marked loss of blood the danger of manual removal is very great. In cases of placental retention associated with hemorrhage the author first attempts to stop the bleeding by means of an aorta compressor. If this does not prove successful the placenta is immediately removed with the hand because it is the hemorrhage which makes manual removal such a dangerous operation. Where there is placental retention without hemorrhage not more than two hours are permitted to elapse before the placenta is removed. However, the placenta is not removed until an attempt has been made to separate it by injecting fluid into the umbilical vein and until a Credé expression has been tried under anesthesia. The use of an aorta compressor definitely reduces the danger of manual removal of the placenta and also its incidence. Injury to the uterus is not to be feared if the operation is properly performed.

Prolapse of the Placenta. M. P. Rucker[8] reports an unusual case from the out-patient service of the Medical College of Virginia. The patient was a negro woman, 28 years old, who had been delivered by a mid-wife seven times, without complications. There had been no abortions. The present pregnancy had been apparently normal. There had been no prenatal care. On June 28, 1920, she was returning home about 8 P. M. with a basket of clothes on her head. She sud-

(7) Monatschr. f. Geburtsh. u. Gynäk., February, 1926.
(8) Am. J. Obst. & Gynec., February, 1926.

denly felt faint and began to bleed. After she rested on the curbing for a while the faintness passed off. She then walked home, a distance of one-half mile, without difficulty. After getting home she began to have pains and the bleeding commenced again and continued until the placenta was expelled at 3 A. M. It was at this time that a call was sent to the Memorial Hospital. The patient was found in a pool of clotted blood, but she was no longer bleeding. The uterus was rigid and reached 2 cm. above the navel. The midwife exhibited the placenta in a basin. It was devoid of membranes except at one edge where there was a little tag about 3 by 7 cm. The midwife had severed the cord a few inches from the placenta. The attachment of the cord was eccentric. The fetal surface of the placenta was smooth and glistening, and there were no torn blood vessels. The maternal surface was apparently intact.

Shortly after arrival of the doctor, the mother began to have severe bearing-down pains almost continuously. The head was born at 3:50 A. M. and restitution was to the right. There was no laceration. The fetus, a female, was rigid with rigor mortis and weighed 3175 gm. Ossification was complete. Nothing unusual was found at autopsy.

From a review of the literature the author concludes that prolapse of the placenta is usually a complication of placenta previa. It may, however, occur in exceptional cases, such as twins, malpositions, and disproportion between head and pelvis when the placenta is normally situated. The only symptom is antepartum hemorrhage and the diagnosis is made by finding the placenta of the undelivered child outside of the uterus. The prognosis for the mother is not bad. On the other hand, it is exceptional that the child is born alive.

The Significance of Rectal Examinations During Labor in the Prophylaxis of Puerperal Wound Infections. A comparison was made by T. Koller[9] of 4,017 women examined vaginally and 4,017 women examined rectally during labor. Neither elevation of temperature nor mortality can be used as criteria to determine the question of prophylaxis of puerperal wound infections. The real criterion is the frequency of perituerine puerperal infection in these two classes of cases. The author's study indicates that women who are examined vaginally more frequently have perituerine puerperal wound infections than do women who have only rectal examinations during labor. This is comprehensible when we review the rôle of the bacteria of the genital tract in puerperal infection. We know that in gravid women who have had no genital manipulation the vaginal bacteria do not produce puerperal infection. However, the vulvar bacteria are not in this category and they may be forced up into the vagina and into the cervical canal by manipulation of one kind or another, among the latter being vaginal examinations. By means of rectal examination, such misplacement of vulvar bacteria, especially pyogenic bacteria, does not occur.

Further Studies in Puerperal Infections and Their Treatment. While in the last twenty years hospital obstetrics has shown a definite improvement in both maternal morbidity and mortality, it is a fact that even under the most favorable conditions, puerperae become infected and puerperae continue to die, notwithstanding all that can be done for them.

Recently, three drugs (dyes of the analine group), *i.e.*, acriflavin, gentian-violet, and mercurochrome-220, have received considerable attention and more or less enthusiastic support.

(9) Arch. f. Gynäk., 1926, Vol. 127.

In order to combat blood stream infection, J. O. Polak[1] emphasizes that one of two conditions must obtain: Either we must increase the resistance of the individual by supplying her with such cellular elements as can react and destroy the bacterial invaders by the natural processes, or we must put into the circulation some chemical which will destroy bacteria without impairing the function of the individual tissues. It has been claimed that gentian-violet, acriflavin, and mercurochrome can do this.

From experiments the following conclusions may be drawn:

First.—That the bacterial inhibiting power of neutral acriflavin upon the hemolytic streptococcus within the body is so slight, even in large doses, that the intravenous injection of the dye is not a legitimate therapeutic measures in hemolytic bacteremia.

Second.—Eggerth has proved that acriflavin has a selective action on certain body tissues which causes it to be taken up by some of these tissues in such concentration as to injure or destroy them. This is especially true of the kidney which shows degeneration of the convoluted tubules while the conducting tubes contain casts and detritus. The liver shows degeneration about the central vein and the liver cells are shrunken and contain large quantities of fat.

Regarding mercurochrome, it may be said with positiveness, that intravenous injections in no way interfere with the progress of the infection. This has been Polak's experience clinically, and has been confirmed by experimental evidence showing that hemolytic organisms exposed for three hours to concentrations of 1:10,000, which represents the maximum concentration of this dye obtainable in the circulation has no bactericidal action, and that when employed in the strength of 7.5 mg. to the kilogram of body weight,

(1) Am. J. Obst. & Gynec., October, 1925.

diarrhea and urinary suppression with prostration have resulted.

On the other hand, properly matched human blood supplies the necessary resistance against bacterial multiplication. Its advantage is that it is nontoxic and when combined with Ringer's solution to which acid sodium phosphate is added, restores the alkalinity and dilutes the toxins already present, besides adding the necessary cellular elements to combat the bacterial invasion.

When Ringer's solution with acid sodium phosphate added in a proportion of 1:1000 grams to the transfusion is employed, the alkalinity of the blood is increased and maintained for sufficient time to allow the natural body fluids to carry on their battle with the toxin; for only by increasing the activity of the cellular elements of the blood and of the body fluids can bacterial invasion or bacterial growth be stayed.

Many have objected to transfusion because of the severe reaction that occasionally occurs. This can be obviated by doing the transfusion during the remission in temperature; preceding it with a hypodermic injection of ¼ gr. of morphin and a 1/200 gr. of scopolamin; and matching and rematching the blood of both donor and recipient. These three simple precautions will obviate putting the added strain of reaction upon an already weakened patient.

Transfusion has another very important therapeutic use. In those severe infections which are prolonged over weeks with consequent secondary anemia and leukopenia where the individual resistance by prolonged illness has been so lowered that reaction is ineffective, transfusion with a supportive diet and fresh air offers the only chance of cure. One mistake that we are apt to make is to delay the activity of our combative treatment until the bacteria have multiplied to such an extent as to produce an overwhelming toxemia. It is much easier to produce a reactive resistance

with the patient when she becomes infected, by early transfusion, than it is to wait for the return of the blood culture.

From this study Polak believes:

1. That the puerpera who recovers from a puerperal infection, whether it be in the blood stream or in the local tissues, does so as a result of a reaction sufficient to inhibit the further growth of the bacterial invader.

2. That it has been shown experimentally and clinically, that these dyes in a concentration of 1:10,000 which is the highest concentration compatible with life, irritates the liver, kidney, and heart, and results in a definite pathology in each of these organs; that the intravenous use of these dyes will give only a temporary increase in the leukocytosis; and that this increase is not maintained for a longer period than twenty-four hours.

On the other hand, blood transfusion does increase the cellular elements of the blood, does increase its alkalinity and the alkalinity of the tissue fluids and thus increases the reaction against bacteria; as well as improving the function of the several eliminative organs.

[The Editor's experience with these aniline dyes is not as large as Polak's, but it agrees fully with his. The most recent statistical report of 76 puerperal infection cases treated by the mercurochrome method of Young showed a percentage of deaths higher than that of the cases treated at the Chicago Lying-in Hospital by the old fashioned expectancy plus good nursing.]

The Influence of Coitus on Premature Rupture of the Membranes and the Course of the Puerperium. A series of 775 labor cases was studied by M. P. Linbimowa[2] to determine this question. Among 523 patients who had coitus during the last two months of pregnancy, there were premature rupture of the membranes in 10 per cent. whereas among 238 patients who had no inter-

(2) Zentralbl. f. Gynäk., May 29, 1926.

course during this time, premature rupture of the membranes occurred in only 5 per cent. Premature rupture after coitus did not occur more frequently among the multiparas than among the primiparas. No serious case of puerperal fever was found among the patients who had coitus during the last two months and premature rupture of the membranes. However, among these women, morbidity of a serious character during the puerperium occurred in 4.5 per cent., whereas it occurred in only 2.1 per cent. among those who did not cohabit during the last months of pregnancy. Mild infections were noted in 17.5 per cent. of the former group as contrasted with 8.5 per cent. of the latter group.

[One woman in the Dispensary service of the Chicago Lying-in Hospital died from infection acquired at the same time that coitus ruptured the membranes.—Ed.]

The Treatment of Septic Puerperal Fever with Large Quantities of Alcohol by Mouth. In a series of ten patients with puerperal fever good results were obtained by H. Küstner[3] by giving large doses of alcohol by mouth. In three cases there was no improvement but all three patients could not tolerate alcohol and vomited it. Alcohol stimulates the heart but paralyzes the musculature of the blood vessels which causes a dilatation of the skin vessels with a resulting sensation of warmth. Alcohol furthermore diminishes metabolism and hence saves strength. The form in which alcohol was given was wine and cognac. The alcohol was given in the afternoon when the patient usually had a chill and when there were many bacteria in the blood stream. Alcohol destroys a large number of bacteria and diminishes the vitality of many others so that they can be destroyed by the protective mechanism of the body.

[The Editor had thought this ghost of John B. had been laid long ago.]

(3) Zentralbl. f. Gynäk., May 8, 1926.

Report on Antistreptococcus Serum. Letters were sent by E. Novak[4] to a selected group of twenty-five men who by their pre-eminence might well be expected to reflect the most trustworthy clinical opinion of the day. Twelve of the group were general surgeons and thirteen were men identified with gynecology or obstetrics, or both. Many of them occupy chairs in large universities or medical schools, and all are the heads of large clinics. Each one was asked, for "a general personal estimate" of the value or lack of value of antistreptococcic vaccine. Of the twenty-five leading surgeons, gynecologists and obstetricians who were questioned as to their opinion of antistreptococcus serum, sixteen considered it of no value, one said he knew nothing about it, and eight expressed the opinion that, while usually unsatisfactory, it might for certain indications be of real value. The chief of these was for a supposed protective or prophylactic action, while occasional good results are mentioned where the proper strain of streptococcus happens to be selected. Not a single one of the twenty-five questioned evinced any degree of enthusiasm for the serum.

[The Editor has seen a very few, *apparent*, cures by means of serum. Most often it does no good—but, in his experience, no harm. Beware of anaphylaxis!]

Metrorrhagic Form of Puerperal Infection. The hemorrhages which occur late in the puerperium after delivery at or near term are not always associated with retention of fragments of placental tissue. Secondary hemorrhages may occur without retention, even two and three weeks postpartum. The appearance of the hemorrhages coincides with the onset of symptoms of a severe infection, and a septicemia may follow if intrauterine manipulation is practised in the attempt to relieve the uterus of suspected placental remains. A. Couvelaire[5] has observed three cases of this kind. The first case was mild and recovered after simple

(4) J. A. M. A., Jan. 16, 1926.
(5) Bull. Soc. d'obstét. et de gynéc., March, 1926.

exploration of the uterus. The second patient was treated by curage, curettage and tamponade, but she died. The third case which was complicated by a streptococcus infection of the adnexa had a vaginal hysterectomy early and recovered. The name suggested for this syndrome is metrorrhagic form of puerperal infection. Its evolution is comparable to the secondary hemorrhages which occur in infected wounds. The only treatment in the severe cases is hysterectomy.

Metrorrhagic Form of Puerperal Infection. Levy-Solal and Ravina[6] report five cases of secondary hemorrhage which occurred post-partum independent of any retention of placental tissue in the uterus but which were due to infection. One patient died of septicemia. In all five cases blood cultures taken on the first day were negative. The cases were treated by inserting tampons saturated with streptococcus filtrate for two purposes, namely, hemostasis and vaccination. The treatment outlined by the authors is as follows: (1) Abstain from curetting the uterine mucosa to avoid spreading the infection; (2) insert into the uterus tampons saturated with the filtrate of cultures of streptococci after gentle evacuation of blood clots; (3) if the hemorrhages cease and the temperature falls, continue the tampon treatment; (4) if improvement does not follow, perform a vaginal hysterectomy.

Treatment of Puerperal Fever by Injections of the Patient's Own Hemolyzed Blood. M. Descarpentries[7] has thus far treated 63 cases of puerperal fever with injections of the patient's own hemolyzed blood. Detailed histories are given of the last twenty cases. In one case shock resulted after the first injection and hence no further injections were given. The remaining nineteen patients recovered under the treatment. The author says the injections are entirely inocuous. (He overlooks the case of shock.)

(6) Bull. Soc. d'obstét. et de gynéc., April, 1926.
(7) Bull. Soc. d'obstét. et de gynéc., October, 1925.

[Still 5,000 or more women die every year in the United States from puerperal infection. Many would recover if left to the natural powers, but the doctors interfere too much. The rules at the Chicago Lying-in Hospital are simple:—Remove all stitches and provide good drainage; apply hot wet dressings (25 per cent. alcohol in boric solution), to vulva; a surplus of fresh air; extra fine nursing (diet, rest, etc., etc.); plenty of liquids (salt and 5 per cent. glucose solutions hypodermically). Occasionally we use physiotherapy, the Zoalite infra-red ray lamp locally, and the quartz lamp generally. We are not yet in position to say that we have bettered our results. It seems that the infra-red rays hasten the softening and suppuration of parametritic exudates. We sometimes use antistreptococci serum,—results?, but no harm. We have used blood transfusions with both benefit and harm, but are trying to perfect our technic. Hysterectomy has not been done for true sepsis,—yes—for infected fibroids. Ligation of the veins, not yet, as the cases have recovered without it, where a recovery was possible. When we determine pus present we evacuate it,—but not in too much of a hurry. Nature is wonderful.—Ed.]

The Treatment of Mastitis by Means of the Bardenheuer Incision. L. Seitz[8] recommends the use of the Bardenheuer incision for recurring mastitis with multiple abscesses, for deep-seated and retromammary abscesses and for diffuse phlegmonous inflammation over a great part of the breast. The incision is made as follows: An arc-shaped incision is made at the lower edge of the breast, thereby separating the gland tissue from the underlying tissue. The breast is lifted up, all abscesses are opened and gauze is inserted into the wound. Because of the position of the incision there is abundant drainage when the patient is in the horizontal position. When the scar heals it is entirely concealed by the overhanging breast. This incision was used by the author with success in seven cases.

(8) Monatschr. f. Geburtsh. u. Gynäk., November, 1925.

Physiology

Interferometric Predetermination of Sex in One Hundred Cases. According to R. Dyroff[9], the Abderhalden reaction and its modifications, such as the Lüttge-v. Mertz reaction, are not better than the best of the optical methods, namely, the interferometer. The principle of the latter is as follows: Serum from the patient to be examined is mixed with an organ extract (testis or ovary) and kept in an incubator. If the organ extract is affected there is an increase in concentration of the serum. The latter can be measured by comparing it with the original serum. Of the hundred cases examined the sex was correctly determined before birth in seventy-four.

The Physiology of the Human Amnion. From researches in the histophysiology and chemistry of the amnion and the vernix caseosa H. Keiffer[1] comes to the conclusion that the vernix is the result of the secretion of the cholesterides and glycerides by the amniotic epithelium. The fetal skin furnishes the epidermal cells and a small proportion of the fat due to the activity of the sebaceous glands. The fat elaborated by the amnion at the same time as the amniotic fluid becomes liquid and agglutinates the squamous epithelium of the epidermis and amnion. The fetus by its movements in the bag of waters accumulates this material on its back and outer surfaces of its limbs. One never finds vernix on the chest.

Vernix caseosa is not a waste material but seems to be an embryotrophic substance Its richness in proteids, cholesterin, glycerides, and lipoids prove this. Since the latter substances are antihemolytic and antibactericidal we should allow the vernix to be absorbed

(9) Monatschr. f. Geburtsh. u. Gynäk., May, 1926.
(1) Gynéc. et Obstét., July, 1926.

by the skin after birth. It will be absorbed in eight to twelve hours because the fetal skin has extraordinary powers of absorption. Since following this procedure and keeping the baby warm immediately after birth, the incidence of hemolytic jaundice of the newborn has decreased to negligible proportions.

The Secretion and Absorption of the Liquor Amnii and Its Disturbance in the Presence of Monstrosities. Anatomical studies have shown that the liquor amnii is a special secretion of the amniotic epithelium and it has been supposed to come chiefly from the epithelium of the placental portion of the amnion. The epithelium of the latter differs from the rest of the amnion for its cells are high and cylindrical and appear to have secretory activity. The amount of fluid which reaches the liquor amnii directly through the maternal blood is very small.

H. R. Schmidt[2] points out that the epithelium in cases of polyhydramnios does not differ much from the epithelium of normal cases. Polyhydramnios may result not only from hypersecretion but also from lessened absorption. A great part of the absorption occurs in the alimentary tract of the fetus after the liquor has been swallowed. In many cases of polyhydramnios there is an absence of such absorption because of atresia of the upper intestinal tract. Such a case of polyhydramnios associated with a tracheo-esophageal fistula is reported by the author. The opening between the two organs was barely large enough to permit water to pass. In this fetus the intestinal tract was entirely empty and was tightly contracted.

The Difference in Size of Twins and Its Cause. From 1907 to 1924 there were 180 multiple pregnancies in the Tübingen Clinic. Four of these were triplets. Among 129 pairs of twins, 75 per cent. were double ovum. T. Brandess[3] was surprised to find that the

(2) Monatschr. f. Geburtsh. u. Gynäk., January, 1926.
(3) Monatschr. f. Geburtsh. u. Gynäk., December, 1925.

average difference in length between single ovum twins was 2 cm. while in double ovum twins it was only 1.6 cm. The difference in weight varied in proportion to the difference in length There was absolutely no connection between the size of twins and the size and weight of the placentas or the size or insertion of the umbilical cords.

An important factor in producing differences in the size of twins is the anastomosis of the two placental circulations by a sort of third circulation. Because of this anastomosis there may be stasis in one fetal circulation with resultant impairment in nutrition of the associated fetus. The extreme form of this results in fetus compressus. Such a placental anastomosis not infrequently occurs also in double ovum twins. Furthermore, difference in twins may depend upon the fact that one child inherits more characteristics of the paternal parent and the other child more of the maternal one. Hence, one head may be large and the other small. Infarcts may influence the size and weight of babies, as may also disturbances in the umbilical cord circulation, such as false knots. Likewise infection of the mother may produce difference in the size because twins are not usually affected equally. Hemorrhages during pregnancy may cause difference in size and the bleeding may be due to low insertion of the placenta or to partial separation of the placenta, which interferes with the blood supply of one fetus. The results of this study indicate that the difference in size of twins depends more upon external than upon constitutional factors.

A Study of Single Ovum Triplets. Two New Cases. The chief criteria of the fact that a triplet is of the single ovum type is the finding of a single chorion for the three fetuses. Thus far at least 34 such cases including the two new ones described by A. Sasse[4] have been reported in the literature. A study of these cases

(4) Acta obstet. et gynec. Scandinav., 1925, Vol. IV.

leads the author to emphasize that a common chorion or a connection between the placental vessels of the fetuses is proof that there was a single ovum. A difference in sex excludes that possibility.

In the case of triplets, single ovum ones are the least common, triple ova come next in frequency, while the most common are double ova triplets There is no evidence for the assumption that the tendency to single ovum multiple pregnancy is inherited. One egg giving rise to two embryos occurs four times as often when two eggs are simultaneously fertilized (thus producing double ovum triplets) as when only one egg is fertilized (producing single ovum twins).

A repetition of triplets did not occur in the reported cases. About one-third of the patients were primiparas. The pregnancies usually ended prematurely and the viability of the children of single ovum triplets was only one-half that of triplets in general. Females predominated. Polyhydramnios was often present and velamentous insertion of the cord was a usual occurrence.

Complications

Disturbances in the Frequency of Fetal Heart Tones During the First Stage of Labor. Among 6,035 labors studied by W. Zangemeister[6] there were anomalies in the fetal heart tones 113 times (2 per cent.). This consisted of slowing, acceleration and irregularity. The result was that 23 per cent. of the children died and 30 per cent. were born asphyxiated. The most unfavorable prognosis was in the cases where the heart tones slowed down to or below 100. In the present series this occurred 52 times with an intra-uterine mortality of 42 per cent. (17 per cent. where the heart tones went down to 100 and 50 per cent. where the

(6) Zentralbl. f. Gynäk., Apr. 3, 1926.

heart tones went below 100 per minute). Of the remainder 29 per cent. were born asphyxiated. In nine-tenths of the cases death occurred in the first stage and especially in the latter half of the first stage. Disturbances of short duration were just as unfavorable as those which lasted a long time. An interesting fact is that in 94 per cent. of these cases there was premature rupture of the membranes and among these cases 65 per cent. of the babies were born dead or asphyxiated.

When there is an anomaly in the heart tones immediately after rupture of the membranes it is relatively harmless, but when the anomaly occurs later the prognosis is bad. This is probably due to a disturbance in the placental respiration. In 19 cases there were disturbances in the circulation of the umbilical cord (prolapse 13, loops 5, and knot 1). Of these 19 babies, 16 (84 per cent.) were born dead or asphyxiated. Prematurity plays no part in these disturbances but overripeness does.

Acceleration of the heart tones occurred in 43 cases without any mortality but 24 per cent. of the children were born asphyxiated. In one-third of the cases no cause could be found but in 60 per cent. of the cases there was premature rupture of the membrane. In 42 per cent. the cause was fever in the mother.

Irregularity of the heart tones was observed 18 times. There were three intra-uterine deaths, but eight children were born asphyxiated, making a total of 65 per cent. Increased duration of the irregularity did not increase the mortality. Variations in rate between 120 and 160 are of no significance but when the heart tones vary from less than 120 to more than 160 the prognosis is bad.

A comparison of the anomalies of fetal heart tones in the first and second stages of labor shows that the anomalies are less frequent in the first stage but much more unfavorable.

[Irregularity of the fetal heart, slowing and acceleration are all significant, but, unfortunately, they are not always positive indications of fetal danger. They always mean that something is affecting the child adversely but our trouble comes in deciding how much and what we are justified in doing to extricate the child from its *probable* perilous position. In the second stage of labor there is no reason for hesitation,—at the first sign of danger to the fetus one should effect delivery. In the first stage one should hasten it by the metreurynter. The woman should be placed in the knee chest position for a while to relieve possible pressure on the cord. If the pains are too strong, anesthesia is indicated. If abruption of the placenta is the cause of the bad heart tones, abdominal delivery arises into consideration.—Ed.]

The Significance of Chloroform Inhalation in the Treatment and Etiology of Intra-Uterine Asphyxia. It has long been known that chloroform has a stimulating effect on diminishing fetal heart tones. Seitz called attention to this in 1903 and before him v. Winckel demonstrated that chloroform diminishes the strength of uterine contractions; hence Seitz believed that the stimulating effect of chloroform on fetal heart tones was due to relaxation of the uterine muscle. Since January 1, N. Louros and H. Müller[7] used chloroform in cases of intra-uterine asphyxia and among 800 cases found 39 with asphyxia. The indication for the use of chloroform was a diminution of fetal heart tones to 100 or less during at least two intervals between pains or marked irregularity of the heart tones. The mothers were given 5 to 8 drops of chloroform per minute so that there was no appreciable disturbance in the sensorium of the mother or appreciable transfer of chloroform to the fetus.

The cases are divided into two groups, those in which no other procedure was used, and those in which the

(7) Zentralbl. f. Gynäk., July 17, 1926.

chloroform failed and labor was terminated artificially because of the intra-uterine asphyxia. Chloroform was found to be efficient only in those cases in which the asphyxia resulted from failure of the uterus to relax in the interval between pains. .In all these cases (23) no instrumentation was resorted to because chloroform and forceps are competitors. By the use of chloroform many forceps deliveries, even high forceps were avoided. In sixteen cases chloroform failed and the children had to be saved by some other means. In these cases the cause of the asphyxia was found in the babies because all of them showed one or two tight loops of cord. Hence, these children had a disturbance which could not be relieved by chloroform. But even in these cases some good influence was observed on the fetal heart tones by the administration of chloroform while preparations were being made for delivery. From these experiments the authors conclude that chloroform is a good test for the cause of fetal asphyxia. If chloroform fails, a disturbance in the fetal circulation is present and labor should be terminated without delay.

[We have been using lobelin with great success in cases of pure asphyxia.—Ed.]

Notes on the Etiology and Epidemiology of Impetigo Contagiosa Neonatorum. The observations of D. L. Belding[8] corroborate the opinion of the previous investigators who find that a strain of staphylococcus aureus of special virulence is the etiologic agent in impetigo contagiosa neonatorum. A pure culture of staphylococcus aureus isolated from an impetigo lesion failed to produce skin lesions in guinea-pigs and rabbits. The same culture caused a nonvesicular inflammatory reaction in the skin of an adult and a typical exfoliating lesion in an infant from whom the organism was originally isolated. A hemolytic streptococcus isolated

(8) Am. J. Obst. & Gynec., January, 1926.

from the same infant produced only a small atypical lesion.

The cultural characteristics of the impetigo staphylococcus are practically the same as those of the ordinary staphylococcus. A questionable minor difference in the rate of carbohydrate fermentation is recorded. The viability of the staphylococcus makes the disease transmissible through both human beings and inanimate objects, and renders disinfection of an infected hospital especially difficult. In the epidemics under observation it is probable that the transmission of the disease occurred chiefly through the nurses and the nursery supplies.

The variation in the different epidemics is due probably to a difference in the virulence of the infecting strain. The difference in clinical symptoms between adults and children or in individual infants seems to be due to the resistance of the host. The primary prophylactic measure in a hospital epidemic is the individual handling of the well infants, as early cases are capable of transmitting the infection before a diagnosis is made.

On a Possible Cause for Pemphigus Neonatorum. A Preliminary Report. Going over the possible sources of irritation in recent epidemics of pemphigus neonatorum, the antiseptic solutions came under the scrutiny of R. E. Krigbaum[9], and he found that all of the institutions were using the commercial liquor cresolis compositus and not the proprietary preparation. There came also to his attention at this time, these facts: First, that when these epidemics started in hospitals, the first few cases seemed to have mild lesions which responded readily to treatment, but after the epidemic had continued for some time, the organisms seemed to have become more virulent. Second, that early in the epidemic the preliminary lesions were located under the mandible, around the umbilicus, in the arm pits,

(9) Am. J. Obst. & Gynec., April, 1926.

and in the inguinal region where an obstetrician most frequently touches with his hands a baby being delivered, his hands just previously having been dipped in lysol solution. Third, he discovered that one epidemic started a very short time after the hospital had received a new barrel of liquor cresolis compositus. Fourth, about six months before when this thought came to mind, one of the three hospitals discontinued the use of liquor cresolis compositus and adopted a proprietary preparation and since that time they have had no cases of skin lesions in any form.

With the foregoing observations in mind, the author went to the delivery rooms of five local hospitals and secured samples of the antiseptics which they were using. He also secured a sample from the Department of Chemistry of Ohio State University. These six specimens were submitted to the Department of Physiological Chemistry of the Medical College of Ohio State University and investigated.

The analysis showed free alkalinity in the commercial preparations.

The results are not proof that this free alkalinity is the cause of trouble, but the fact that the lysol with a zero alkalinity has no toxicity and the three preparations with high alkalinity have toxicity suggests a possible correlation between the two. The results also show considerable variation in the free alkalinity of different preparations of the liquor.

From the foregoing observations the author says positively that: First, no liquor cresolis compositus which has not been titrated to determine its free alkalinity should be used in delivery rooms or nurseries in such a way that it might come in contact with babies' skins, no more than we would wash diapers in strong alkali; second, that one cannot eradicate an epidemic of pemphigus by changing the solutions in the delivery rooms or nursery without resorting to the usual methods of isolation and prevention, because, when an epi-

demic is once started, the mild staphylococcus increases in virulence as a result of its rapid transmission from one host to another, to such an extent that it becomes capable of infecting a normal nonirritated baby.

[At the Chicago Lying-in Hospital delivering over 3,000 babies per year we use the commercial preparation of liq. cres. comp. We have not had an epidemic of pemphigus in ten years, although sporadic cases occur now and then. In our opinion the staphylococcus develops in the wound secretions of the navel and is carried there by the nurses, the nursery supplies, and, in infected general hospitals, by the dust-laden air. In maternities, isolated from the infections prevalent in general hospitals, epidemics of pemphigus are rare and sporadic cases infrequent. It is in the surgical and medical wards that one must look for the cause of pemphigus.

The treatment of an epidemic is preventive and curative. Preventive, in putting the maternity in a separate building, in establishing a perfect aseptic technic for caring for the babies, in removing the first case of pemphigus from the maternity and in special watchfulness of the remaining babies. If an epidemic has broken out it is almost impossible to eradicate it without closing the maternity. Then paint, scrub, sterilize, etc., etc., everything before re-admitting patients. In a general hospital it is not long, however, before a new outbreak occurs,—the maternity has been re-infected. The Editor knows of hospitals where pemphigus is endemic nearly all the time, the cases as they occur being sent home or to another part of the building.]

Can the Diagnosis of Single or Double Ovum Twins Be Based Upon the Membranes with Certainty? Among 200 pairs of twins studied by H. W. Siemens[1], there were found four cases of absolutely certain single ovum twins in which there were two distinct placentas and in a fifth case there were two distinct chorions.

(1) Arch. f. Gynäk., 1925, Vol. 126.

On the basis of these cases the author concludes that a certain proportion of single ovum twins have two separate placentas and sometimes apparently two separate chorions. Because of this a diagnosis of single ovum twins should not depend upon the membranes but upon the similarity of the children, especially the dermatological similarity. The following are the criteria: The color of the hair, color of the eyes, color of the skin, the distribution of lanugo, freckles, dilatation of the skin capillaries, furrows in the tongue, contour in the face, form of the ear, form of the hand, and the body form. In the discussion of this paper Albrecht added that this new conception is possible if the separation of the ovum into two takes places not in the gastrula stage but in the blastomere stage. In the latter event it is possible to have two distinct chorionic membranes. [Finger and footprints?—Ed.]

The Prevention of Stillbirths. Some of the most frequent causes of stillbirths according to C. R. Hannah[2] are: syphilis, placental disturbances, disproportion between fetus and pelvis, malpositions, prematurity and postmaturity, accidents of childbirth, toxemia, and slovenly obstetrics.

Syphilis has its own record in the number of stillbirths and should be diagnosed and treated to lower this mortality.

Premature separation of the placenta, low implantation, and placental apoplexy are often unavoidable, and may terminate disastrously for both mother and fetus.

All pregnant women, whether apparently healthy or not, should have a complete physical examination early in pregnancy. The inlet and outlet of the pelvis should be accurately measured early in pregnancy. Too often the measurements of the outlet are neglected, assuming that a knowledge of the inlet is sufficient. It is as important to recognize the prematurity, maturity, and post-maturity of a fetus as it is to have a knowledge

(2) Am. J. Obst. & Gynec., February, 1926.

of the size and shape of the pelvis. The measurements of the fetus may be made as accurately as the measurements of the pelvis. Repeated measurements of the fetus develop judgment in estimating its size and maturity. [Oh, the Editor wishes this were true!]

Malpositions should be corrected; breech presentations should be converted into cephalic presentations whenever possible, and a follow-up treatment instituted to prevent a return to abnormality.

The treatment of most cases should be conservative, with the administration of sedatives to relieve pain and obtain rest. This conservative treatment, however, should not be carried to the extreme and permit the patient to become exhausted before interference is made to convert the posterior into an anterior position.

Toxemia of pregnancy is a preventable disease. Eclampsia may be prevented by proper hygiene, limitation of the diet to prevent excessive gain in weight over the standard weight, proper elimination, and adequate and intelligent supervision of the physician by giving instructions to the patient each week. Intelligent prenatal care will usually prevent toxemia of pregnancy, the cause of many stillbirths.

The study of the causes of stillbirth indicates that the methods of delivery, as practiced by the average physician, should be improved. More clinics should be available for the doctors in general practice that they may be given the opportunity to correct their errors, improve their technic, and understand the mechanism of labor.

[This author is very hopeful. The Editor tries hard to measure the baby and has used all the methods extant, but he often fails,—and has recently made an error of two pounds,—in a thin woman, too. But he is not discouraged; on the contrary such failures stimulate to harder effort. "Toxemia of pregnancy is a preventable disease." Perhaps the author means death from toxemia is preventable. Even if he means this the Editor can-

not agree with him. Eclampsia, too, cannot always be prevented, but, if given proper co-operation we can usually forestall its occurrence, and almost always so ameliorate the severity of the toxemia that death does not ensue.

Such sweeping statements are likely to be quoted in malpractice suits and lead to injustice.]

Intra-Uterine Fetal Death, A Clinical Radiological Study. From a study of the roentgenograms of over 700 pregnancies among which there were eleven cases of intra-uterine fetal death, I. F. Stein and R. A. Arens* conclude that the history of cessation of fetal motion, absence of heart tones, a peculiar stillness on auscultation over the uterus, and a low basal metabolic rate are significant clinical data in establishing the diagnosis of intra-uterine fetal death. Overlapping of cranial bones and asymmetry of the head have been observed in the live fetus to the same degree as in the dead. Therefore, these signs which were described independently by Horner and by Spaulding as pathognostic of fetal death, are not pathognomonic signs.

Collapse of the vertebral column in the dead fetus cannot be distinguished in the roentgenograms from apparent or illusory acute angulations of the spine in the live fetus. According to the authors, the fetus may be dead certainly as long as four days and fail to show overlapping of cranial bones or asymmetry of the head. The diagnosis of intra-uterine fetal death cannot usually be made by means of the *x*-ray independently of other clinical data.

The Problem of the Macerated Fetus. In spite of the increasing success attendant on the efforts of modern preventive medicine it is astonishing to note the record of the stillbirth rate. A gross rate of forty-one per 1,000 as they have had at the New York Lying-in Hospital in 1924 is discouraging; nor is it any the less so to compare it favorably with a general stillbirth

(*) Radiology, September, 1926.

rate of 47 per 1,000 for New York as a whole, or with the rate of 53 per 1,000 for Detroit.

Of all the classes of stillbirths, the greatest numerically is represented by the so-called macerated fetus. For the most part, even before labor is initiated, a good proportion of the stillbirths have ceased to live and already begun to undergo decomposition. The following list published by M. Rosensohn[3] shows this strikingly for the year's work at the Lying-in Hospital (1924): Total confinements, 5,457; total stillbirths, 227 or 4.1 per cent.=41 per 1,000; total full term macerated, 94, or 1.7 per cent. = 41 per cent. of stillbirths. Stated in another way, these figures mean that almost half of the stillbirths were probably dead before admission to the hospital. Syphilis is by no means a common cause. This is borne out, both by the records of 1924, and also, by those of nine months of 1925 to October 1. In more than half of the cases of macerated fetus, there was no evidence of syphilis, clinically, by test or by autopsy.

Looking further into the causes the striking figure is represented by the cases occurring in toxemic mothers; there were 13 of these, 41 per cent. of the stillbirths. The following table gives the causes which were ascertained:

Syphilis	15
Toxemia and eclampsia	13
Previous stillbirths	5
Diabetes	4
Tight cord	3
Fall or blow	2
Placenta previa	2
Hydrocephalic monster	2
Pyelitis	1
Premature separation of placenta	1
Fibroid uterus	1
General peritonitis in mother	1
No ascertainable cause	44
	94

(3) Med. J. & Record, June 2, 1926.

In the figures quoted in these tables we have some indications for preventive measures. We have every reason to expect results, from specific treatment, started early and pushed assiduously in the luetic cases. Close observation from the earliest recognizable period of gestation with proper regulation of diet, hygiene, and so forth, can expect to reduce considerably the number of toxemic and eclamptic cases. The diabetic, by proper dietary regulations and medical treatment may also be carried through a normal confinement.

But the most disappointing feature at the present time is the number of cases in which the cause is unascertainable or unrecognizable. In 44 cases or almost half the full term macerated fetuses, the author could not discover any cause for the intra-uterine death. How to attack this group is a most worthy problem. Its solution depends on an intensive, cooperative effort between internist and obstetrician; a study, more thorough than ordinarily can be accomplished in the antepartum clinic, and should be undertaken by a skilled medical man to determine the existence of focal infection. The newer developments and tests for the determination of function of the various organs, including especially the internal glands, should be applied. The bacteriological study of the vaginal flora may reveal significant factors.

The Early Diagnosis of Anencephalus. In 1916 Case reported a case successfully diagnosed as an anencephalic before birth, the conclusion being based upon the roentgen appearances. J. T. Case and J. E. Cooper[4] now have five additional cases of anencephalus to report, three of which were successfully recognized before the onset of labor and the diagnosis in each verified by roentgen examination. These five cases were encountered among the 1,621 obstetrical patients handled by the maternity department of the Battle Creek Sanitarium during the last ten years. (Plate VII.)

(4) Surg., Gynec. & Obst., August, 1926.

[Anencephaly may be suspected, even during pregnancy by the findings on careful examination. The absence of the round cranial vault is suggestive; polyhydramnion, slow labor; irregularity of the presenting part,—even found by rectal touch; the thought of the possibility of a monster all help. The Editor has diagnosed two anencephali by means of the *x*-ray.]

The Danger of Malformation of the Fetus in Roentgen-Ray Treatment During Pregnancy. Since roentgen rays have been employed with increasing frequency in the diagnosis of pregnancy and in the treatment of pathologic conditions during pregnancy, the question of possible damage to the fetus caused by irradiation has attained considerable interest.

It is rational to group the cases reported according to whether irradiation has been used on the maternal ovary before conception or on the uterus during various stages of pregnancy. This report by E. Ries[5] is concerned with a case of the second group.

Of 21 of the reported cases in this group (collected by Zappert) 11 showed some sort of damage to the fetus, while 10 fetuses were born normal.

The case described here is of special value, since the fetus was born dead and a postmortem examination revealed interesting findings. The mother was a primipara who in childhood received treatment for hypothyroidism On October 5, 1924, the patient had intercourse with a man whose history is unknown. In November, 1924, she had a copious hemorrhage for which she consulted a dispensary and was treated with hydrastis and ergot. However, the bleeding continued for two months and in January, 1925, she was sent to the *x*-ray department of the Postgraduate Hospital where she received five roentgen-ray treatments.

May 26, 1925, she was sent to the *x*-ray department again for diagnosis and the picture showed a fetus in the uterus. This picture shows no malformation.

(5) Am. J. Obst. & Gynec., March, 1926.

July 21, 1925, the membranes ruptured. The woman came to the hospital soon afterward. Labor lasted 24 hours at the hospital and terminated spontaneously. The fetus was born dead in head presentation. The placenta was said to have been intact. The woman made a good recovery. She menstruated regularly again and worked, addressing envelopes. Thyroid treatment has to be administered constantly. If she is without it, she suffers from severe mental depression.

The dead fetus was placed in 2 per cent. formalin without being opened and was sent to Ries in this condition in October last. It presented a hydrocephalus 44 cm. in greatest circumference. The right arm consisted of upper arm and part of the hand without any trace of forearm. The hand had three fingers, no thumb. The roentgen-ray examination of the arm showed bone in the three fingers, no trace of forearm and apparently normal humerus. No other bony malformation except extremely thin bones of the calvarium were visible.

On opening the skull, external and internal hydrocephalus was seen, but the brain was so decomposed and pultaceous that it could not be sectioned. No thyroid gland was found. The thymus extended from the middle of the pericardium almost to the chin.

The duodenum was enormously distended to the size of the stomach. There was no uterus or vagina, right kidney, ureter or adrenal gland.

While there might be some question whether or not the bony malformations had been caused by the roentgen treatment during gestation, there is not likely to be any doubt about the malformations described in the abdomen.

As the fetus was approximately mature and the last radiation treatment was given 159 days before the birth of the fetus, it is evident that such conditions as absence of right adrenal, kidney and ureter and absence of uterus and vagina must be due to defects of forma-

tion antedating the treatment applied when the fetus was about 109 to 121 days old.

[While the connection in this case between the radiation and the deformities is equivocal, the literature abounds in proven instances of harm to the fetus from exposure to radium and *x*-rays. Even the ovary exposed to them may produce eggs from which monsters result. —Ed.]

Further Observations on "Roentgen Children." The question of whether radiation of the ovaries in sexually mature women deleteriously affects later offspring is of great interest at the present time. At the Second Woman's Clinic in Vienna P. Werner* found that radiation increased the incidence of abortion and affected the development of babies which were born after radiation. He reports 45 pregnancies which occurred in 22 women after *x*-ray treatment of the ovaries. Of the 45 pregnancies 18, or 40 per cent., ended in abortion and of the 27 living children, 3 were premature, 5 died early, and 22 remained alive. One of the latter had a tracheal stenosis, one a cardiac anomaly, one bow legs, one rickets and one had pulmonary tuberculosis. Two-thirds of the 27 children were females.

In experimental work on animals radiation has a tendency to produce abortions and inferior offspring. In may cases aomalies appear in the second generation. Hence among humans we may have to wait many more years before we really know how much damage *x*-ray treatments can produce. The preponderance of females in the present series is another indication of the damage done by *x*-ray for among the abortions in the early months the males usually far outnumber the females. This is because the males are more easily affected than females.

Roentgen-ray treatment has essentially two fields in women. First for the production of temporary sterility and second, to combat hemorrhage which is the result of

(*) Arch. f. Gynäk., 1926, Vol. 129.

some disorder of the glands of internal secretion, especially in young women. In the author's clinic, radiation of the ovaries for amenorrhea has long been discarded in favor of radiation of the hypophysis which gives equally good results. For the production of temporary sterility more certain methods than radiation are at hand. In the second class of women, those with hemorrhage, *x*-ray treatment of the hypophysis, the thyroid, the spleen or the liver gives as good results as radiation of the ovaries.

The author a few years ago reported two cases where *x*-ray treatment was given during pregnancy and both children were normal. He now reports a third case but here the child was a Mongolian idiot and had a hydrocephalus. In the literature there are many case reports of deformed children born after *x*-ray treatment during pregnancy.

Constriction Injury of the Fetal Head by the Cervix. Injuries produced by the cervix may arise because of rigidity at the external os or the internal os. E. Poeck[6] reports two cases in which injury of the fetal head was produced by the cervix. The first child showed a deep furrow on its head corresponding to the amount of dilatation of the external os which persisted for twenty hours. During this time the external os was extraordinarily rigid. The furrow rapidly disappeared. In the second case there was a much larger depressed ring which was produced by a tight constriction in the cervix situated about 5 to 6 cm. above the external os. The author does not believe that these constriction rings in the cervix can be caused by spasms. He believes the latter are responsible only for contraction rings. For constriction rings in the cervix rigidity is the primary and essential factor. This is the reason such rings are found almost exclusively in primiparas, especially in old primiparas. However, there is often in addition to the rigidity, some element of spasm due

(6) Zentralbl. f. Gynäk., Sep. 4, 1926.

to special mechanical stimuli. These cases are almost always associated with premature rupture of the membranes and in these cases morphin or pantopon is indicated. In the cases of rigidity, however, narcotics are of no avail. Here the rigidity must be overcome by hard labor pains.

Injuries of the Infant During Delivery. Before considering the damage done to the cerebro-spinal system in childbirth, P. B. Bland[7] directs attention to the possible trauma inflicted to the buccal mucous membrane by the method customarily employed in removing secretions from the baby's mouth.

Another condition, though not strictly an injury, yet one which may legitimately be placed in the category of birth accidents, is infection of the stump of the umbilical cord.

Damage may occur particularly after long labors and also in precipitate labor in which the child is forcibly driven through the pelvic canal. While it is well to recall that almost all forms of injury to the child may arise during spontaneous or normal delivery, the large proportion of injuries occur after difficult manual or instrumental labor. It is of interest to note at this time that accumulated evidence tends to disclose that conditions heretofore regarded as congenital are in reality late expressions of damage sustained during birth, conditions which, in the beginning did not give rise to prominent symptoms and which were undetected because of indifferent care or lack of knowledge on the part of the obstetrician.

Parturitional nerve injuries are limited almost exclusively to the facial and brachial plexus. These are nearly always the result of complicated labors and usually of artificial deliveries. While nerve injury may occur in all varieties of presentations, most authorities believe that the Duchenne-Erb type of palsy, which involves the fifth and sixth cervical nerves, is

(7) Am. J. Obst. & Gynec., April, 1926.

found almost exclusively after breech presentations. [See Sever's article later.—Ed.] This point, however, still seems open to controversy. Ehrenfest assigns direct pressure of a forceps blade as occasionally responsible. More frequently, he states, trauma inflicted in delivering the after-coming head is the causative factor. Respecting the mechanical factors as influential in obstetric paralyses, those upon which responsibility is usually placed are:

1. Direct compression, manual or instrumental.
2. Traction resulting in overstretching.
3. Traction causing plain tearing.
4. Compression or traction followed by blood extravasation or inflammatory disorganization.

Obstetric Facial Paralysis. — From the obstetric standpoint palsy of the muscles supplied by the seventh nerve fall into two groups: those following spontaneous labor and those following manual or instrumental delivery. In the first group injury is sustained only when there is frank disproportion between the diameters of the fetal head and the maternal pelvis. The trouble is seen chiefly in the various forms of contracted pelves, especially the flat pelvis, the head presenting transversely, with excessive cranial stress being directed from the sacral promontory, the symphysis, or an abnormal bony prominence. As a rule, the trouble arises after primary cephalic presentations, rarely after breech presentations.

The Mechanics of Birth Injuries, Their Cause and Prevention. Decrease in birth injuries, according to J. W. Newman and W. E. Levy[8], will come to pass only if the following points are borne in mind:

1. The term "injudicious use of forceps" is really a misnomer; "injudicial" would describe better the almost criminal abuse practiced with this instrument. High forceps, the cause of so many stillbirths, and so many traumatic lesions leading eventually to lowered

(8) Am. J. Obst. & Gynec., May, 1926.

mentality, should not be done in any institution, least of all in one where obstetrics is practiced as a specialty. Even the application of mid-forceps is limited to a small number of cases, and all the possible sequelae of faulty application, pressure injuries, and so forth, should be weighed carefully before resorting to this procedure.

2. Pituitrin is a bone of contention among obstetricians today, and it will always remain so until we realize that its use, before or indeed, after delivery, should be as dependent upon the skill and experience of the attendant as is the use of the scalpel in the hands of the surgeon.

3. Version is a much more delicate obstetric procedure than cesarean section, is much more difficult of performance, is not so spectacular, and requires considerably more skill, thought and mental and physical composure. Moreover, in no obstetric procedure is the accoucheur more dependent upon a well-trained associate, especially when it comes to the delivery of the head. Here, too, the application of forceps is not permissible, for the reason that the child's head has already been subjected to almost sufficient pressure to bring about disastrous results.

4. When neither mother nor child give evidence of the evil effects of the so-called prolonged labor, the authors fail to see any reason to interfere merely on the ground that a certain period of time has elapsed since the first pains.

5. Mouth-to-mouth insufflation before removal of all mucus from the trachea, instead of achieving good results, nearly always forces the mucus further down towards the bronchi and thereby mechanically obstructs respiration.

Injuries to the clavicle and to the bones of the arm and the leg are fairly frequent. Fractures of the clavicle are most often caused by traction over the shoul-

A typical case of anencephaly. Lateral roentgenogram.

Anteroposterior study of a case of anencephaly.—Case and Cooper, page 253.

PLATE VIII.

Old case of obstetric paralysis, showing deformity of head, marked hooking of the acromion, flattening of the glenoid, and subluxation of head.—Sever, page 265.

ders in delivering the aftercoming head in breech extractions.

Fractures of the humerus are injuries of the direct type and are the result of making traction on the arm itself, particularly in a case of aftercoming head where the arms are extended. No attempt should be made to deliver an arm anteriorly, as the symphysis forms a natural barrier to such an attempt. Injuries to the bones of the lower extremity are nearly always confined to the femur and are invariably due to haste and poor technic.

Nerve injuries are fairly frequent, and the amount of trauma will determine whether the end-result is a paresis or a paralysis. Aside from those resulting from central lesions, the most common injuries of direct origin are to the facial nerve and the brachial plexus. The former is most often caused by pressure of a forceps blade and more rarely by the bones of a contracted pelvis. In reviewing the records at Touro Infirmary the authors found that a temporary paresis, seldom lasting more than 4 or 5 days occurs in about 4½ per cent. of all forceps deliveries.

The authors conclude that a large percentage, estimated to be as high as 75 per cent. of birth injuries may be avoided. Practically every type of birth traumatism has been observed in cases of spontaneous labor. The medical student should be made familiar with the natural mechanism of labor through careful and thorough teaching, and should be taught that interference is a last resort and not a first procedure. The published statistics which tend to show the lowering of the fetal mortality rate are misleading, inasmuch as this reduction is due to better prenatal care, which eliminates deaths from toxemia and other preventable causes. Birth injuries are still responsible for an appalling number of fetal deaths, and reduction along this line can come only from proper obstetric teaching and practice.

[The way some authors splash around in half-knowledge and fling out positive generalizations, is very discouraging to a hard worked and conscientious Editor. There is so much to dispute in this article that the Editor will name only the points on which he agrees; items 2, 5, and some of the conclusions.]

The Factors Involved in the Production of Intracranial Birth Injuries. The conclusions which this paper by A. H. Baker[9] suggest on the subject of intracranial injuries during labor, are based partly on a survey of the important published papers on the subject, and partly on the series of 100 autopsies on dead-born and still-born fetuses of viable age, and on infants dying in the neonatal period, carried out in the Gynecological and Obstetrical Unit of the Royal Free Hospital.

Cranial stress is believed to depend on two main factors—the outside pressure to which the intracranial contents are subjected, and the degree of congestion of the cerebral veins and dural sinuses. The post-mortem evidences of cranial stress are tears of the tentorium; marked engorgement of the vessels of the pia mater, of the choroid plexus and of the intracranial sinuses; and intracranial hemorrhages. It is suggested that tears of the tentorium are a sign, not so much that undue force has been exerted on the head, as that it has been exerted in the wrong diameter, *viz.*, the occipito-frontal. That this type of force is injurious to the contents of the skull is shown by the fact that the majority of cases of fatal intracranial stress show lesions of the tentorium.

Intracranial hemorrhage has two main causes: (1) intense venous congestion caused by acute anaerosis, and (2) stress of delivery. Sub-tentorial hemorrhage is probably almost always due to cranial stress and is fatal. It is often accompanied by tentorial tears, but may occur without them; and its cause is rupture of the vein of Galen or of its tributaries. Hemorrhage

(9) J. Obst. & Gynec. Brit. Emp., 1926, Vol. 33, No. 2.

due to asphyxia alone is in the form of a general oozing over the surface of the hemisphere—subpial or subdural. The hemorrhage in this series occurs more frequently in full term or postmature than in premature fetuses. It is suggested that full flexion of the head in the application of forceps and in breech deliveries, apart from involving a smaller diameter of the head, and thus aiding delivery, would prevent many cases of tentorial tearing.

Intracranial Hemorrhage in the New-Born. In summarizing a series of 500 consecutive new-born babies on whom a lumbar puncture was performed, within from 12 to 24 hours after birth, it was noted by W. Sharpe and A. S. Maclaire[1], that in 45 babies there was disclosed bloody and blood-tinged cerebrospinal fluid, that is, 9 per cent. of the entire series. It is pointed out that as many as 50 babies, that is, 10 per cent. of the entire series, were not tapped—in 36 a dry tap was recorded, and in 14 the test was not performed as 7 babies were in severe shock and 7 premature babies were in poor condition.

The authors believe that intracranial hemorrhage of varying degree in the new-born occurs rather frequently (in 9 per cent. of this series). Its acute signs are often meager and may be apparently entirely absent, the more common signs being from drowsiness to stupor, from difficulty to refusal to nurse and from muscular twitches to general convulsive twitches. First born full-term males having difficult prolonged labors are more liable to this complication, forceps being used as a last resort rather than their early application; also those delivered by medium forceps and breech extraction.

Hemorrhagic disease of the new-born is not a common etiologic factor, at least in this series of cases, in which puncture was done and tests were made within from 24 to 48 hours after birth. Lumbar puncture as

(1) J. A. M. A., Jan. 30, 1926.

an early diagnostic method when the hemorrhage is still in fluid form, and as a therapeutic means of spinal and cranial drainage, is a simple and safe procedure in the absence of severe shock.

The early recognition and the appropriate treatment of the acute condition of intracranial hemorrhage in the

[Levinson of Chicago has found anthrochromia of the spinal puncture fluid in a still larger percentage of new-born babies and the yellowish tinge he holds is due to blood.—Ed.]

Birth Injury of the Brain and the Pathology of the First Days of Life. The pathologic-anatomic investigations in the last few years have demonstrated an unsuspected frequency of damage to the brains of new-born babies. Premature children suffer the greatest injury. In addition to the anatomical demonstration of this injury there have been clinical reports concerning the same thing. According to A. Wiechers[2], in the vast majority of the cases where death was ascribed to weakness and other causes damage was found in the nervous system and especially in the brain. In all children who remain alive until the fifth day and die after vague clinical symptoms, careful examination of the brain will show injury in practically every case. Hemorrhages and areas of softening may be seen with the naked eye nearly always. Furthermore, one finds in the majority of babies which die up to the thirtieth day after birth, typical changes in the brain which are the result of birth injuries.

Symptoms in the new-born which may be due to brain injury are convulsions, athetotic movements and diminished sucking reflex. There is a parallelism between the pathological findings and clinical symptoms of injury of the brain at birth and brain injury in the adult. Both have the same mortality because they

(2) Med. klin., Oct. 30, 1925.

have the same cause of death, namely injury of the brain.

Obstetric Paralysis. J. W. Sever[3] presents a brief report of 1,100 cases of obstetric paralysis. The right arm was affected 670 times and the left 430 times, or about 64 per cent. in favor of the right arm.

The types of paralysis differed, the most usual one being the so-called upper arm type, of which 829 cases were recorded as against the so-called lower arm or a better name the whole arm type in which besides the fifth and sixth cervical roots being injured, the seventh and eighth and first dorsal roots were injured. Of this type, 208 cases were recorded. In 63 cases both arms were affected, the whole arm type being the least common. It is generally acknowledged that a difficult and prolonged labor is a predisposing factor of the greatest importance in the causation of this type of paralysis. In this series, 584 cases were definitely recorded as long and difficult. In a large proportion of these cases, forceps were used, either high or low; most of the mothers had ether, which presupposes a relaxed and asphyxiated child. All these factors contribute toward establishing the ideal condition for the production of such a paralysis.

Others reported that the head was delivered naturally, but the shoulder stuck behind the pubes and at that time force was applied.

In regard to the presentation, there were recorded 443 head or face presentations and 142 breech. It has been supposed that breech presentations were the usual cause of the whole arm type of paralysis, but these figures refute such a theory. There is an undue predominance of primiparas in this series. Cord injuries practically always follow breech extraction and are caused by traction and lateral flexion of the trunk.

There are generally two well recognized types of paralysis seen. The more common, the upper arm type,

(3) J. A. M. A., Dec. 12, 1925.

consists of a lesion that involves the fifth and sixth cervical roots and the supracapular nerve and produces a paralysis of the muscles of the upper arm only with the exception of the supinators. The less usual type, the so-called lower arm, or whole arm type, is the result of injury not only to the fifth and sixth cervical roots, but to the seventh and eighth and possibly the first thoracic as well. Here the whole arm is flaccid; there is a wrist-drop and paralysis of the small muscles of the hand. There occasionally occurs the pure lower arm type of paralysis without any involvement of the upper cords of the plexus, the so-called Klumpke's paralysis. These cases show a paralysis, usually the result of stretching of the plexus from overextension of the arm in cases of face presentation, and due to injury to the lower cords of the plexus. (Plate VIII.)

Pupillary inequality is of the greatest importance. A good many cases present at first pupillary inequality, with the small pupil on the affected side. If this pupillary inequality persists in connection with the wrist drop or the whole arm type of paralysis beyond six or eight weeks, the author is sure he is dealing with a serious injury to the plexus which has probably resulted in an evulsion of the two lower roots of the plexus from the spinal cord, and so breaks the reflex sympathetic arc, which connects with the motor control of the eye. This is an important pathognomic point, and if the pupillary inequality persists, one may be absolutely sure and safe in giving a bad prognosis.

In the whole arm type the author feels that three months is a fair period to try massage and muscle re-education and if there is no evidence of any functional return during that period, that it is fair at the end of that time to explore the plexus and attempt to repair it. In the upper arm types, he often waits until the children are four or five years old, because by that time he can also divide muscle contractures that are

preventing free use of the arm. He has had no brilliant results from the plexus repair.

[The numerous articles on birth injuries attest the frequency of this form of obstetric damage, and the fact that finally the profession gives signs of waking up to a realization of the importance of this branch of medicine. Better obstetrics comprises the all for the prevention of these and similar parturitional disasters,—better teaching, better practice, better hospitals, better recognition of the dignity of the art of the accoucheur, and we are slowly working up to these things.—Ed.]

Etiology and Prophylaxis of Congenital Dislocation of the Hip-Joint. Congenital dislocation of the hip-joint cannot be demonstrated in the newborn. Lorenz failed to find a single case in an examination of 1,000 new-born and very young children. There may therefore be at birth only a predisposition to dislocation.

Congenital dislocation of the hip is frequently hereditary, the incidence generally given varying from 14 to 20 per cent. Vogel reported that 25 per cent. of his cases had presented by the breech. The predisposition of dislocation is increased by anteversion of the neck of the femur. The embryo keeps its thighs in a markedly bent and adducted position. After birth this attitude is changed to one of stretching, which causes a lengthening of certain muscles, especially the ilio-psoas. When this muscle is passively stretched it lifts the femur upward out of the acetabulum and produces an external rotation of the femur. As prophylactic measures, H. Krukenberg[5] advocates the following: Young children should not be urged to assume the upright position and should not be permitted to stand too early. They should be permitted to crawl first. Since there is a predisposition to displacement in children born breech first, roentgen-ray pictures should be taken if there is the slightest sign of any disturbance because the early stages of luxation per-

(5) Monatschr. f. Geburtsh. u. Gynäk., March, 1926.

mit easy correction without operation or the use of casts. Children in whose families there is hereditary dislocation of the hip-joint should be especially watched.

Lead Poisoning in Nursing Infants. H. B. Wilcox and J. P. Caffey[6] have not found the use of lead nipple shields by nursing mothers previously demonstrated as a source of lead poisoning in infancy. Two such cases are the subject of this report.

The use of the lead shield on the maternal breast is the only tenable source of lead intoxication in these cases. The late onset excludes congenital poisoning. Excretion of lead in the breast milk is not probable in view of the negative chemical examinations of the milk, the absence of stippling in the maternal erythrocytes and of saturnism in the mothers, and the failure of the history to establish such sources as suspicious cosmetics and hair dye. Neither infant was fed from nursing bottles. Lotions and ointments were not used on the breasts in conjunction with the breast shields.

The clinical picture in both cases was that of vomiting, meningeal irritation and anemia. Clinically, these symptoms had no characteristics sufficiently distinctive to differentiate them from like symptoms in more common diseases.

None of the manifestations in the classic lead triad were present—colic, palsy and the presence of a lead line in the gingival mucous membranes. This suggests that, in nursing infants, lead poisoning is probably too seldom considered as a diagnostic possibility when such common symptoms as vomiting, general nervousness and anemia constitute the clinical picture. The history of a source of lead, basophilic degeneration of the red blood cells, the changes in the spinal fluid, and the chemical detection of lead in the excreta were the most valuable aids and the final proofs in the diagnosis of lead poisoning in the reported cases.

(6) J. A. M. A., May 15, 1926.

The presence of lead in the feces of both babies demonstrates that lead in appreciable quantities may be ingested by infants suckling breasts which have been exposed to lead shields. The detection of lead in the urine of one case is absolute evidence that after ingestion from this source lead can be absorbed into the blood stream and, in the present cases, in sufficient amounts to affect the blood and to cause changes in the spinal fluid. These findings warrant the conclusion that lead poisoning in both patients was caused by the use of lead nipple shields.

There is no indication in the cases reported that the use of lead shields for two or three weeks can cause lead intoxication. However, the present cases do demonstrate that the lead nipple shield is a definite source of danger to the nursing infant if used for longer periods and that, if the control of the mothers by the physician is not sufficient to insure the discontinuance of the shields after a few weeks, other therapeutic measures should be used in the treatment of the diseased nipples.

Syphilis of the Placenta in the Negro. As a basis for a syphilitic placenta, J. R. McCord[7] has accepted the changes recently described by Eardly Holland: The villi are uniformly enlarged and closely packed; a reduction of the intervillous spaces; an increase in the density of the stroma and of the stroma cells; diminished vascularity of the villi. He agrees with Holland's statement, that the vessels in a syphilitic placenta are not closed by an obliterating endarteritis, but rather that the villi have never been properly vascularized.

The conclusions of McCord's personal study are: Syphilis was demonstrated in 15.4 per cent. of the 1,000 placentas examined. In 966 women, the Wassermann was positive in 22.5 per cent. In 655 babies the cord Wassermann was positive in 0.7 per cent. The Was-

(7) Am. J. Obst. & Gynec., June, 1926.

sermann reaction repeated on 396 women agreed in 88 per cent.

Syphilitic placentas were found in 40.6 per cent. of the positive Wassermann cases, and in 0.3 per cent. of the negative Wassermann cases. In 84 premature babies born alive, the placentas were positive in 28.5 per cent. In 84 premature babies born dead, the placentas were positive in 67.8 per cent. Of 219 positive maternal Wassermanns, the cord Wassermann was positive in 14.5 per cent. of the cases. Of 747 negative maternal Wassermanns, the cord Wassermann was positive in 0.107 per cent. Of the positive placentas, 75 per cent. had positive maternal Wassermanns.

Notes on the Diagnosis of Syphilis as the Cause of Stillbirth. According to J. F. Taylor and J. Forest-Smith[8], the following points are of value in making a diagnosis of syphilis in the stillborn when spirochetes have not been found in the tissues or it is not practicable to search for spirochetes:

1. In favor of syphilis:—
   (a) Enlargement of the spleen (.45 per cent. of the body weight may be taken as a "borderline").
   (b) The presence of chondro-epiphysitis.
   (c) A positive Wassermann reaction in the mother. (If possible this should be repeated some weeks after the puerperium.)
2. Against syphilis:—
   (a) No maceration of the fetus.
   (b) The fetus reaches full time.

No evidence can be obtained from:—

(a) The weight and length of the fetus.

(b) The relative weight of the liver, kidneys or placenta.

Congenital Syphilis in Ten Pairs of Twins. J. Cassel[9] has been fortunate enough to see ten pairs of twins who had congenital syphilis. These ten pairs occurred

(8) J. Obst. & Gynec. Brit. Emp., 1925, Vol. 32, No. 3.
(9) Med. klin., Dec. 18 and Dec. 24, 1925.

among 700 cases of congenital lues which is a little higher than the usual incidence of twins. In studying these twins the author found that the disposition to infection with the spirocheta pallida can be different in twins of the same sex as well as those of the opposite sex. Likewise the time of appearance of symptoms may vary among twins and furthermore the reaction of twins to syphilis is usually unequal. If we assume that fetuses can be infected with syphilis only through maternal transfer by way of a syphilitic placenta and that this occurs before or during labor, then we can conceive that in biovular twins one fetus may remain uninfected because its placenta was not involved. In single ovum twins, however, both fetuses are nourished by the same placenta, hence both must be infected. The belief in the transfer of infection from the maternal blood also explains the difference in the appearance of syphilis in some twins because one placenta may have been infected later than the other, thereby affording a difference in the incubation period. Furthermore, the difference in the number of spirochetes may account for the difference in the appearance of symptoms. This likewise holds true only for biovular twins. Another mode of infection other than the placental is the movement of spirochetes along the lymph spaces of the umbilical cord to the organs of the fetus. By this method also the difference in the number of spirochetes may account for the difference in incubation period. Of the twenty children in this series, seven died.

Stigmata of Hereditary Syphilis in the Newborn. The evidence upon which a diagnosis of hereditary syphilis is based is, according to Commandeur and Rhenter[1], as follows: (1) A marked disproportion between the weight of the placenta and the weight of the fetus in women who show definite signs of syphilis. The weight of the placenta must be at least one-

(1) Bull. Soc. d'obstét. et de gynéc., May, 1926.

fifth the weight of the fetus. (2) Apparent lesions. (3) Anatomic lesions found at autopsy. Based upon these criteria the incidence of syphilis in the newborn is rare; it was found in less than 1 per cent. of cases among 43,892 infants at the Charité from 1904 to 1925, and at the Maternité from 1903 to 1919.

There are four classes among the cases of hereditary syphilis and these are macerated fetuses, stillbirths, children born alive and dying later, and children born alive and leaving the hospital alive. The chief anatomical lesions found in newborn fetuses with syphilis are hypertrophy of the liver and spleen and changes in the epiphyseal-diaphyseal line of the cartilages. The chief apparent lesions are palmar and plantar pemphigus, a very large abdomen with excessive subcutaneous venous networks, a large spleen and coryza.

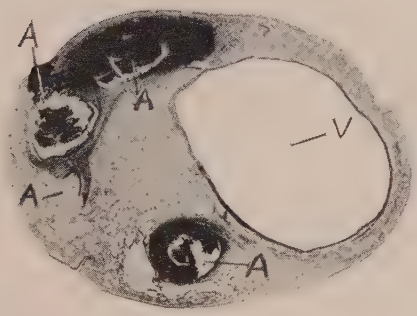
The Placenta

Determining the Intactness of the Placenta by an Air Test Instead of a Milk Test. H. Franken[2] advocates the following test: The placenta is immersed in water and the umbilical cord is grasped with a clamp in the region of the umbilical arteries. The umbilical vein is pulled over the tip of a large syringe which is filled with air. The latter is then injected through the vein into the placenta. At every site where there is a break in the fetal circulation, be it a laceration or a defect, air bubbles arise. If no air bubbles are seen, the fetal circulation is closed and the placenta therefore must be intact. About 50 to 100 c.c. of air are usually required for this test.

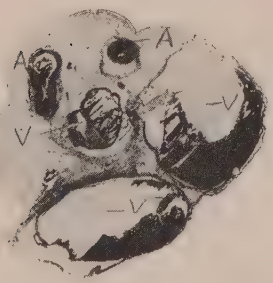
When air bubbles are seen the placenta should be very carefully examined to rule out defects because the air bubbles do not indicate whether there is a lacera-

(2) Monatschr. f. Geburtsh. u. Gynäk., April, 1926.

PLATE IX.

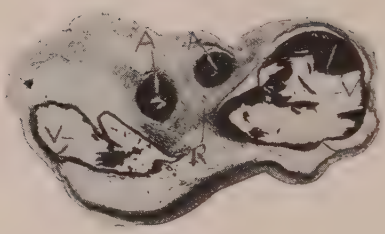


Section showing four arteries and one vein.



Section showing three veins and two arteries.—Vaux and Belk, page 273.

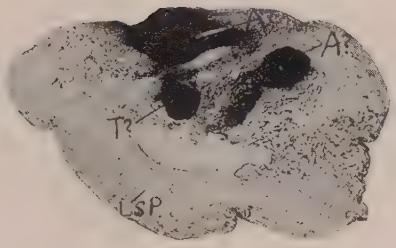
PLATE X.



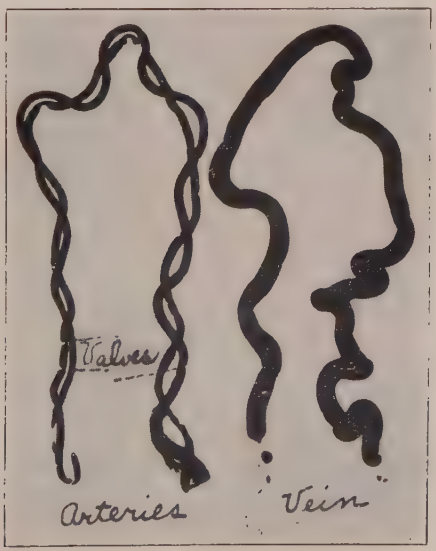
Section showing two arteries and two veins, and remnant of umbilical vesicle (R).

Section showing four arteries and one vein.—Vaux and Belk, page 273.

PLATE XI.



Section showing three thick-walled vessels, one thrombosed (T); large lymphatic spaces.



Vein and both arteries of cord injected with metallic mercury; no valves in vein.—Vaux and Belk, page 273.

Showing close apposition of two lobes, their syncytial coverings being pressed together. On either side is seen the capillary angiomatous stroma. (Case 5.)—Siddall, page 277.

tion of the blood vessels or a real defect in the placenta which necessitates exploration of the uterus.

The Umbilical Cord. The more prominent characteristics of the histologic structures of the umbilical cord are by no means a constant factor, and vary greatly in a large proportion of cords studied. Each cord, in fact, so differs definitely from another, that only a few positive findings can be accepted as facts.

The membranes of the cord appear as a thin layer of cells, from one to five deep, which have some resemblance to squamous cells, which is consonant with their ectodermic origin. The stellate cells of Wharton's jelly are more numerous in some areas than others, in places being entirely absent.

The nourishment of this structure has interested N. W. Vaux and W. Belk[3] especially. All specimens contain rather wide spaces, with clear-cut walls. In most cases these have no endothelial or other cellular lining. Conceivably these represent lymph spaces.

Near the large vessels there is a definite concentration of cells of connective tissue type, which assume a circular arrangement, and are continuous with the outer coat of the vessels. The main arteries showed pronounced variations. In 2 instances, 5 vessels were found on cross section. In 1, four arteries and 1 vein, and in another 2 arteries and 3 veins. In 3 cases, 4 vessels appeared. Although branching of the arteries was definitely determined by injections, in no instance were the authors yet able to demonstrate branching of the vein. The structure of the vessels is somewhat variable. The valves of the arteries are generally very small notches, hardly visible to the naked eye, which occupy only a part of the circumference of the wall. That these insignificant structures are competent to prevent backflow of blood was demonstrated, injection against the normal direction of flow being found impossible even with much pressure. The veins

(3) J. A. M. A., July 17, 1926.

consist of a relatively thin muscle coat, with a very thin layer of elastic tissue just under the intima. In a number of instances, veins were injected in the direction opposite to the normal flow without apparent difficulty. In the vessels injected and subjected to roentgenography, none of these showed more than three branching vessels. However, an interesting finding was the anastomosing of the arteries by very minute channels. (Plates IX, X, XI.)

Treatment of the Umbilical Cord by Short Ligation and the Use of a Clamp. Septic disease of the newborn can many times be traced to infections of the umbilicus. In some of J. F. Dicks'[4] cases he noticed that when the cord was tied long and did not fall off for ten or twelve days, there was some infection of the umbilicus almost always present, which only careful treatment kept from becoming serious. He noticed, too, that when the cord is slow in falling off it leaves a decided weakness at the ring with a consequent tendency to hernia. [?—Ed.]

The author's technic is as follows: After the cord and surrounding skin are painted with one-half strength tincture of iodin and pulsation has ceased, a Martinez clamp, which has been sterilized, is placed on the cord as near the skin margin as possible in the long axis of the body. The jaws are closed slowly; if this is done too rapidly there is some danger of rupturing the cord below the clamp. The cord is then cut off close to the jaws of the clamp, and an alcohol sponge applied for a few minutes to dehydrate it. A gauze roll is placed about the body, including the clamp. Twenty-four hours later the instrument is removed and that portion of the cord which has been compressed and which is as thin as a piece of parchment can either be trimmed off at once or left to fall off, which it does within a few days. The baby is oiled for several days.

(4) Am. J. Obst. & Gynec., November, 1925.

then washed, but is not put in the tub until the navel has completely healed.

[For 35 years the Editor has employed the ordinary tape ligatures with satisfaction. He has tried numerous new methods proposed with dissatisfaction. The most essential item in the care of the cord is asepsis, rather antisepsis. The cord is already infected by its passage through the vagina. The hands that touch the baby are likewise infected. Both must be completely disinfected before applying the sterile ligature. Of course the asepsis must be kept up during the time the umbilicus is not healed over.]

Spontaneous Rupture of the Umbilical Cord. Two cases of spontaneous rupture of the umbilical cord are reported by R. S. Siddall[5]. In both cases the babies were born alive.

Injuries of the umbilical cord as described in the literature may involve one or more vessels or may consist of complete rupture. Complete rupture occurs commonly from the fall of the child in precipitate deliveries, from the upright or squatting posture, and is not uncommon from forceful release over the head of loops about the neck or from operative delivery when the cord is actually or relatively short. However, in uncomplicated labor in the horizontal posture the accident is exceedingly rare. Forssell, in 1908, found only 26 reports of both kinds of rupture during spontaneous labor (28 with 2 reported by him from 14,639 deliveries), and since that time others have been reported.

In a search for the cause, certain authors have pointed out in their cases anomalies or disease of the vessels which they considered to be at least predisposing factors since the strength of the umbilical cord is largely, if not principally, dependent upon its vessels, though some importance in this respect has been attributed to the whartonian jelly. Weakness of the

(5) Am. J. Obst. & Gynec., December, 1925.

vessel walls has been ascribed to imperfectly developed elastic tissue, to destruction of muscle fibers associated with the inflammatory exudate of syphilis, to the existence of thin walled varices, and to a crushing or grinding injury of cord lying between the child and the pelvic wall. It is supposed, then, that with labor pains the blood is squeezed out of the placenta into the fetal circulation, thus raising the blood pressure to the bursting point of the weakened vessel wall.

Obviously, the foregoing explanation could likely apply only to hematoma formation and bursting of single vessels. For complete separation of the cord, we must rather look to physical injury as the probable direct cause. With the single exception of Funke's case complete rupture has always occurred during the expulsive stage of labor.

The occurrence of rupture where the cord is actually too short for expulsion of the child is doubtless due to direct traction on the cord between the umbilicus and the placenta, which is seldom pulled away (Nebesky). Usually the tear is near the fetal end, since this is most often the weak portion as evidenced by rupture in precipitate delivery from the upright posture and by experimental traction on a number of umbilical cords (Nebesky). Moreover, syphilitic degeneration usually affects the fetal portion first, and crushing between the fetal body and the pelvic wall would be likely to occur near the umbilicus. Kermauner makes the more logical suggestion, it would seem, that the cord becomes fixed at the place of looping and that sufficient stress for rupture between this point and the umbilicus may be caused by extension during labor.

As would be suspected, this accident seriously affects the prognosis for the child alone. Kermauner considered the danger from bleeding to be minimal and referred to the experiments of Rieländer who got only slight bleeding from the fetal ends of severed cords. However, in certain cases blood spurted from the rup-

tured cords until they were clamped and in one of the author's cases bleeding was profuse until the cord could be clamped. In any event, there would be grave danger from asphyxia unless delivery should occur within a few minutes after rupture. Evidently, treatment should be prompt delivery when a diagnosis can be made before birth.

[Crushing the cord against the head by the forceps blade and cutting through it has occurred.—Ed.]

The Occurrence of Chorioangiofibroma (Chorioangioma). A Study of Six Hundred Placentas. A careful bibliographical research included in a recent study of angiofibroma of the chorion revealed only 131 authentic cases since the first report by John Clarke in 1798, indicating that these tumors occur very infrequently. During the routine microscopic examination of placentas, from which only one or two pieces were taken, it has been the experience of R. S. Siddall[6] that small angiofibromata are occasionally found. Consequently, their apparent rarity seemed questionable, and, while placentas were being carefully studied for another purpose, a search was also made for these tumors. Definite angiofibromata were found in six placentas out of 600. (Plate XII.)

In no instance was there polyhydramnios, nor were the tumors otherwise of clinical importance. Such observations are in accord with the results of a previous study, namely: that excessive quantities of amniotic fluid with consequent premature labor and high fetal mortality were associated almost entirely with the large tumors. The small tumors appeared to be of negligible clinical importance.

Inasmuch as six small angiofibromata of the chorion were found in 600 carefully examined placentas, it is concluded that, in contrast to the rarity of the large tumors, the small ones are not uncommon.

[The Editor had one—the size of a lemon.]

(6) Bull. Johns Hopkins Hosp., May, 1926.

MISCELLANEOUS

The Five Most Common Errors in Obstetric Practice. We all make so many mistakes in obstetric practice that it was not difficult to collect five for the purposes of study, but it was not so easy to select the five most common ones. Mistakes vary in number in different localities; with accoucheurs differing in age, education, temperament and ability; with different kinds of patients, and so forth. To aid in picking out the most common errors, J. B. DeLee consulted the mortality statistics of the United States Census Bureau, and reviewed his own experience and recalled his observations of the work of innumerable practitioners with whom he has been associated in the last 33 years. To disarm any possible accusation of Pharisaism he states at the outset that he has made a good many of the mistakes himself (perhaps that is why he knows them so well), and that it is only by constant self inspection and self stimulation that he can avoid repeating them.

The mistakes the obstetrician makes which show up most quickly in the mortality and morbidity tables are as follows:

1. Failure to make a complete diagnosis;
2. Lack of knowledge of or failure to practice the real principles of asepsis;
3. Ignorance of the course of occiput posterior positions;
4. Operating before complete dilatation of the cervix is present;
5. A disappreciation of the pathologic dignity of the art of obstetrics which leads to downright neglect of the woman in labor.

First Mistake.—DeLee believes the lack of complete diagnosis is the worst and most common fault of obstetricians. Probably the same could be said of surgeons. It was a great surgeon, Christian Fenger, who said,

"Any fool can learn how to cut, but it takes a man to make a diagnosis." Indeed, diagnosis is the main thing, what to do will naturally and easily follow and how to do it,—technical skill will come by practice.

When a woman engages a doctor to care for her during confinement, can she always count on the doctor finding out if she will be able to pass through the ordeal safely? Does he also study the case to see if the baby has a fair chance to survive? How many doctors, if they were to look over their obstetric engagement book could answer these questions as applying to all the gravid women?

1. Has this patient a good heart, one that will bear the strain of pregnancy and labor?
2. Are her kidneys sound?
3. Has she syphilis?
4. Are there infective foci in her body?
5. How does she stand before labor?

At the Chicago Lying-in Hospital in the last seven years there were 71 obstetric deaths. Eight of these were due to organic heart disease and of these four could possibly have been prevented had the disease been discovered in time. P. A. Daly, in a study of 200 cases of heart disease at this hospital, has shown that with early diagnosis and proper care the mortality from cardiac impairment can be brought close to zero. There is an old medical aphorism, "Don't fear the heart case that has symptoms." It may be true that diseased hearts with readily perceived evidences seldom cause death—but is this not because the patients are treated? The occult heart disease, the one that causes the unexpected deaths—could be discovered by careful examination and its fatal action averted. Perhaps then less would be heard of "obstetric shock" post partum, of "pulmonary embolism," and so forth.

Of the 71 deaths, six were from eclampsia and allied kidney conditions. Of these five were neglected dur-

ing pregnancy and the fatal termination might possibly have been avoided if the disease had been discovered earlier, at least, if the severity of the damage to the kidneys had been diagnosed. If the woman on her first visit had been thoroughly examined and her history studied the seeds of renal disease might have been found out. Every pregnant woman should be regarded as a candidate for eclampsia.

In the service of the hospital, syphilis is quite rare but they are on the lookout for it all the time. All ward cases have Wassermanns but the test is not a routine in DeLee's private practice. Wassermanns are made on all women with a history of miscarriages or who have suggestive symptoms. It is well known that a positive Wassermann reaction is not so conclusive during pregnancy as in the normal state, but a repeated strongly positive reaction is very suggestive, and is considered positive if the husband's serum reacts also. Then the gravida receives treatment. Contrary to the experience of Williams at Johns Hopkins, syphilis plays a very small rôle in the stillbirth statistics. Failure to discover syphilis is not a frequent error at the Chicago Lying-in.

Infective foci are very likely to be overlooked during pregnancy, and yet not seldom they are responsible for death post-partum, and for diseases of the puerperium, and for abortion, premature labor, and diseases of the newborn. The sinuses, the teeth, tonsils, gall-bladder, ureters, the cervix may all harbor bacteria, which, given proper conditions break out and cause mischief. A patient with pus in her system anywhere, may develop a pelvic phlebitis and die of embolism; she may develop an infection of her endometrium which, passing on to the ovum, kills it, and afterwards the general system may be invaded; a woman with otitis media occasionally develops a general septicemia; one with bad tonsils infects her breasts, and so forth. And the husband must also be regarded as an infec-

tive focus. The husband at each intercourse might inject pus from an infected prostate; the mother may get puerperal infection, the baby gonorrheal ophthalmia. The husband can play another rôle. The child is half paternal and it is possible that it may affect the mother serologically,—its serum may be incompatible with that of the mother. This is a new method of approach in the study of the causation of hyperemesis gravidarum, of eclampsia, chorea, and so forth.

Psychologic Diagnosis.—Finally (though by no means concludingly) must be mentioned the failure to make a full diagnosis of the case just before labor. One of the greatest mistakes and the most common is this lapsus artis. It means that whether or not the general physical examination has been made, the accoucheur is in ignorance of the possible existence of a contracted pelvis, of a breech or shoulder presentation, of an overgrown child, of purulent vaginal discharges, intertrigo, and the like. It means that the accoucheur does not know how his patient stands on the threshold of her labor. It is true that pelvic mensuration is not very reliable, but if the doctors would only use it as far as it is dependable, much could be done. The presentation of the child is of utmost importance and the other conditions mentioned should all be known beforehand.

Diagnosis at Beginning of Labor.—Throughout the whole cycle of reproduction this lack of diagnosis is evident and the fault is committed even after delivery; one example only,—a woman had temperature postpartum and without making a general examination the accoucheur curetted the uterus;—the puerpera had typhoid fever!

Second Mistake.—Failure to comprehend and to practice the real principles of obstetric asepsis is responsible for a large part of the enormous puerperal morbidity and of the 5,000 or more deaths from puerperal infection that occur in the United States each

year. The principles of prevention of infection are not so simple as we used to believe, or, to put it better, we now know that there are other requirements in the conduct of an obstetric case than carrying out an aseptic technic.

Most mistakes under this general heading are made by ignoring or transgressing the principles of infection prophylaxis. The author has found that in order to prevent puerperal infection one must scrupulously observe three laws or principles:

1. Prevent the access of bacteria to the parturient canal;
2. Preserve the local immunities;
3. Preserve the general immunities.

De Lee regrets to have to say, many accoucheurs and many hospitals fail to realize the necessity for perfect asepsis in the conduct of their work. The methods of a perfect aseptic technic are well established, indeed they are standardized, but the human element enters and they are not always practiced. It is because of carelessness, thoughtlessness, laziness, obstinacy, parsimony,—in short, if DeLee were a preacher, he would say—a lack of the spirit of Jesus Christ. Once in a while an honest difference of opinion exists as to what is a perfect aseptic technic, but wherever there is a doubt of the necessity of any reasonable precaution, he claims the patient should have the benefit of a system which removes not alone the actual, but also the possible dangers. He has in mind the question of airborne and carrier infections in general hospitals.

Of equal importance to asepsis, indeed if not of greater moment, is the second principle,—preservation of the local immunities. Credé in 1885 put it very succinctly—"limit as far as possible the puerperal wounds," but more than this is involved. Traumatized tissues are readily invaded by bacteria; a vagina robbed of its epithelium,—ditto; a uterine wall in which the sinuses and lymph spaces are open, the former

filled with soft thrombi,—ditto; a wound that is loosely coapted leaving dead spaces full of lymph and blood,—ditto. Now we know all these things and yet we sin against the obvious laws for the prevention of infection. The accoucheur is rough in his examinations, he bruises the tissues with the forceps, he damages them with unnecessary attempts for the premature dilatation of the parturient canal, he gives pituitrin which tears the cervix and perineum, he scrubs the vagina with antiseptics or mauls it with crude stretchings, he mashes the placenta in the uterus by premature attempts at Credé expression and he leaves this hollow, vascular, absorbtive organ full of decomposable debris, and so he goes on, either ignorant or oblivious or careless of the wrecks in his wake.

This principle is very simple and understandable. If the accoucheur or the surgeon leaves the wound dry, with perfect hemostasis, untraumatized (not injured by a thousand pulling, tugging and stretching insults), in short nearly like it was before the intervention, it will heal well and, the local immunities being preserved, the tissues will easily take care of the bacteria introduced, unless indeed the latter be of exceptional virulence and in large number.

Many crimes are committed against the third principle, "preserve the general immunities."

Labor has all the qualities of a surgical operation and a great deal more. Tissue traumatism, hemorrhage, anesthesia, acidosis, exhaustion, shock,—all are found in obstetric cases, some in greater measure than in the surgical operation, and they all have a distinct bearing on the incidence of infection. That is, they all reduce the general immunities and invite the invasion of bacteria already present in the body, or inadvertently admitted during the operative procedure. Tissue traumatism has once been referred to but will bear a second mention. Besides reducing the local immuni-

ties it affects the system through the toxins absorbed from necrotic and devitalized structures.

Hemorrhage—here the greatest faults are committed. Women are allowed to bleed inordinately during labor under the false conviction that the oversupply during pregnancy may be wasted. Nothing is further from truth. While the total amount of blood is increased during pregnancy, nature did not intend it should *all* be lost at labor; most of it is to be used up in an active metabolism during labor, and, in the puerperium, in making milk and in an active catabolism—which effects the release and removal of the temporary structures required for the building of a fetus, *i. e.*, the uterus, the bones, the fat, and so forth. Further, the blood is needed to turn back the invasion of the hosts of bacteria which are always in the parturient canal waiting a favorable opportunity for attack. The old rabbis said "The blood is the life" and this truism should warn us to always save blood and be very economical from the very start of labor. We do not know how much the woman will lose in the third stage. DeLee saw an obstetrician do an episiotomy preparatory to a forceps delivery. He measured 14 ounces of clot, representing more than a pint (500 c.c.) of blood which the patient lost before the baby was delivered! Most authorities put the physiologic loss of blood at a labor at 500 c.c., about 1 pint. The author places it lower, 200 c.c.—indeed, he strives to make it less than 100 cc.—the women do better in every way. Anemic patients are most prone to infections.

Anesthesia is responsible for many postoperative and post-partum infections, and deaths. Seven of the 71 deaths previously mentioned were due to anesthesia. First it reduces the general immunities through the toxic action of the drug employed, second through the acidosis it causes, and third, most important, it causes bronchitis or pneumonia. The bacteria resident in the air passages, the local immunities there being broken

down, gain ready access to the large pulmonary capillaries and lymphatics, and are disseminated throughout the system. Where will they most naturally settle? In the organ whose resistance is broken down, *i. e.*, the wounded structures—the uterus, the peritoneum, etc. An ether bronchitis thus acquires towering importance. In my experience it is a common cause of peritonitis and the suppuration of wounds. And what crimes are committed with anesthesia!

Exhaustion is another contributory cause of infection. Long labor reduces the general resistance while the continued pounding of the head against the pelvic floor does the same to the local immunities. To these add the acidosis of prolonged muscular effort, the diminution of the alkali reserve brought about by starvation and by loss of sleep, the dehydration produced by sweating and little liquid intake, top it all by an anesthesia or hemorrhage and you have a condition that not alone invites infection but actually drags it in. Bailey, in the American Journal of Hygiene, March, 1925, has shown experimentally on rabbits that acute fatigue enhances the danger of infection.

How many men think of these things during the conduct of labor? Not many or we would not have to bewail our mortality statistics.

Occiput Posteriors.—The third train of errors takes its origin in ignorance of the course of occiput posteriors. Statistics show that over 100,000 babies die in the United States every year during the course of labor. They do not show how many of these babies die because of unrecognized or mistreated occiput posterior position and it is not possible to hazard more than a guess. The author believes it safe to say 5,000 of these babies die because of the position in which they unfortunately have been placed for delivery. Conversely, a good part of 5,000 babies could be saved each year if the mechanism, course, and treatment of this form of dystocia were understood. What part of

the morbidity and mortality of the mothers is to be assigned to this cause can be guessed with even less accuracy. The immediate and remote effects of the prolonged labor, the difficult forceps operations, cervical, perineal and fascial lacerations, and the infections which follow all these cannot be measured.

The most prominent part of this error is failure to make an early diagnosis of the position, the next in importance is the omission of a study of the cause of the difficulty, and third is negligence which allows the right moment for interference to pass by. If a woman enters labor with the head not engaged, if the pains are weak and irregular, if the membranes rupture prematurely, if there is a hollow in the uterine prominence just above the pubis, one suspects occiput posterior position and the suspicion is confirmed by the usual external examination with its classic findings. Later when the cervix is dilated a little, the typical internal findings will clinch the diagnosis. The naggy unproductive pains may be the cause of the abnormal position as well as the effect, and often one will have to treat this element, that is, one must regulate or stimulate uterine action. The slow dilatation of the cervix may likewise be an effect or the cause of the occiput posterior, or both may be the result of the weak pains which do not work the mechanism which brings about rotation. Premature rupture of the membranes is a common cause of dystocia. The cervix is thus robbed of its water bag dilator and the pains remain in abeyance, a vicious circle being established. The line of treatment is indicated—substitute something for the bag of waters—*i. e.*, a colpuerynter. The underlying factor of this particular form of dystocia therefore must be sought out, since it has an immediate bearing on the line of treatment. If a contracted pelvis, if some anomaly of the uterine musculature, some tumor, or some anatomical change in the cervix

exists one may find the wisest course lies in the selection of an early cesarean section.

The error of failure to make a diagnosis of the existence of posterior occiput and continued by failing to discover its primary cause, is concluded, usually with disastrous consequences, in the treatment. The most important function of the accoucheur is to know what he is going to do, and to know it early in the labor. In the treatment of posterior occiput presentation he must decide whether he will pursue watchful and armed expectancy or interfere at once. For the great majority of cases the expectant plan is indicated. To be guarded against are infection and exhaustion. Nature will almost always terminate the case happily if the accoucheur will but be patient. Food, fluids, narcotics and proper care will tide the parturient along until complete dilatation of the cervix is secured. If the cervix gives trouble we have good remedies. If the membranes rupture too soon we have the colpeurynter or the vaginal pack. If rotation fails we have good operations, manual rotation, forceps and version.

Whenever DeLee says version he thinks of that monstrous mistake, Potterism. He did not include it in the list of the five mistakes, subject of this paper, because it is not a common one, fortunately,—though colossal.

Without question version has a place in the treatment of posterior occiput,—especially when the head is not engaged. Whether to turn the head manually or with the forceps after the head has become engaged is largely an individual matter. His own opinion is that most men will do less damage with their hands than with the forceps. The main thing is to correct the faulty position before attempting the extraction, and one must learn the trick of rotating the head—whether one uses the hands or the forceps. This trick is in rendering the head movable,—freeing it from the clutch of the lower uterine segment and from its embedment in the tissues lining the pelvic canal. Under

deep anesthesia, the head is grasped by the whole hand, gently raised from its lodgment, while with a spiral, twisting motion it is turned to its proper position. With a similar motion the surrounding tissues are ironed out using the back of the fingers and dorsum of the hand. After the head has been adjusted as desired one may sustain the correction by means of a vulsellum holding on to the scalp and then apply forceps, or one may keep the head steady with one hand, the other inserting the blades of the instrument. If difficulty in effecting rotation of the head alone is experienced the half hand is advanced to the child's shoulder, this is freed from the grasp of the uterus as was just described and similarly rotated to the front, the pressure being applied to the scapula with the tips of the fingers, the head of the child resting in the hollow palm of the hand. The thumb aids in the rotation.

Kielland's forceps have been recommended as especially useful for these cases, and no doubt in the hands of the skillful technician will achieve good results. Bill suggested to raise the head up with the forceps, twist it into proper position and then extract with the same instrument. Exercising due care and deliberation this method can be performed safely. Indeed, with ordinary skill all the methods will succeed if only the proper diagnosis of the faulty position be made.

Impatience.—The fourth very common error is operating before complete dilatation of the cervix has taken place. To be sure, it is occasionally necessary to violate the rule—not to try to deliver until the cervix is fully open, but such occasions are rare and the indication urgent. One always regrets the necessity as the difficulties of the operation pile up. The lacerations of the vault of the vagina, the tearing of the connective tissue supports of the uterus, the avulsion of the bladder from the pubis all are appreciated as one finds he

is required to overcome the mechanical resistances offered by the soft parts and by the malposition of the head by mere brute force. When the woman develops sepsis as so many do, and later when she returns with backache, leukorrhea, "bearing down feeling," chronic tiredness, and general wretchedness the accoucheur cannot pat himself on the back for doing good work. If he has saved the baby there is a little consolation but if on examining his patient he finds falciform scars radiating from a torn cervix down the lateral walls of the pelvis to the bony outlet, the bladder pouching into the introitus vaginae and a rectocele beginning to form, or indeed a prolapsus already started, he will realize that a large part of the joy of life is destroyed.

The author believes that unnecessary operating before complete dilatation is present is one of the greatest sins that is committed today in obstetrics.

The cervix is anchored in the pelvis by strands of connective tissue and layers of fascia which radiate from it and fasten it, like a balanced hub of a wire wheel, to the pelvis. The cervix might be called the hub of the wheel, the pelvis the felloe, and the strands of fibrous tissue or ligaments the wire spokes of the wheel. When you pull the hub down you stretch, tear and break the spokes, often pulling them out of the felloe. In the same way—if you pull the cervix down you stretch and tear the ligaments from the pelvic walls. Therefore secure spontaneous, full, natural dilatation of the cervix. After this canal is open the head can slip through it without dragging on the ligaments and avulsing them from their pelvic attachments. Avoid, therefore, every maneuver which aims to bring the baby through the cervix and upper reaches of the vagina before the canal is large enough to permit its easy passage without distraction of the cervical ring, and without traction on the cervical and vaginal fastenings. This means one should avoid the use of bags to dilate the cervix, avoid pituitrin, avoid too early

bearing down efforts, avoid the use of forceps before the cervix is completely dilated and retracted over the head. Thus when the baby comes through it will not pull the hub out of the wheel.

Negligence.—The fifth mistake is neglect of the woman in labor, downright neglect of the parturient, due to the general disesteem in which obstetrics is held.

The Shepard-Towner Bill would never have been enacted if the doctors had been giving their pregnant women proper care. Do we have to have federal and state aid to make the surgeons and internists do their work right? In principle, DeLee has objected to this measure, but on the grounds that it forces the doctors to watch their women during pregnancy and that it calls public attention to the misfortunes and needs of the childbearing woman he is for it.

A well known internist once insultingly remarked that an obstetrician has nothing to do but "watch a hole." Out on the frontier men have been shot for less provocation than that, but since the author has observed the work of many doctors a little more, he believes that man was right, that a good many obstetricians do nothing else than watch a hole. Some of them do not even do that. They sit in the doctors' room at the hospital, and swap stories and smoke cigarettes, instead of watching the patient, and in the meantime the baby can die, or the mother can have a hemorrhage, or labor can go on until she is exhausted, or an occipito-posterior can become persistent, or something may happen which should not have happened, and which could have been prevented, if the man had been on the job.

A man who takes care of a woman during labor has a task of some magnitude. If he is going to study the mechanism of the labor, if he is going to investigate the cause of all the little irregularities that appear in the individual labor and give them proper evalua-

tion, if he is going to search out the underlying difficulty, what the Germans call in musical compositions the Leit Motif, if he is mindful of all the accidents that may befall a woman in labor (abruptio placentae, ruptura uteri, eclampsia, etc., etc.), and what dangers threaten the baby (asphyxia, cerebral compression, etc.), and if he watches for their earliest manifestations he will have very little time for loafing, and he will have a piece of work worthy of all his talents be they ever so great, and one whose success will be measured by his devotion to it.

[The Editor has permitted Dr. Greenhill, who makes the abstracts from the literature, to insert his article practically in its entirety because he believes it contains many points of great importance to the men who are "out on the firing line" of obstetric practice.]

Obstetric Mortality. An Analysis of the Cases at the Lying-in Hospital, New York, in 1924. During the year 1924 there were at the New York Lying-in Hospital in an indoor and outdoor service, a total of 4,457 confinements, among which there were 227 stillbirths and 152 infant deaths. During this period there were 23 adult deaths.

M. Rosensohn[8] considers the maternal deaths first, and eliminates one, a surgical case in a patient who was not pregnant. There were 22 obstetric deaths, a mortality of 0.4 per cent., or 4 per thousand. Among these cases were: Two patients with syphilis dying antepartum, after the administration of salvarsan. One case of antepartum sepsis where the patient had been ill for two weeks, had a high temperature on admission, and died within a half hour of the spontaneous delivery of a stillborn fetus. One patient with postpartum sepsis, admitted three days after delivery, by an outside physician, and dying five days later. Two cases of endocarditis with decompensation, one patient in the fifth month, and the other in the seventh month

(8) Am. J. Obst. & Gynec., January, 1926.

of pregnancy. In both of these a vaginal hysterotomy was done for the cardiac conditions; both died within a few hours after the operation.

While these six deaths occurred in the hospital, in the effort to arrive at a figure directly applicable to institutional care it might be feasible for the time to subtract them from the 22 maternal deaths, thus leaving 16 to 5,457, a percentage of 0.3, or 1 in every 341 cases. [Most creditable.—Ed.]

In the 16 cases of the remaining adult deaths, there were 9 cesarean sections, 3 internal podalic versions, and 4 spontaneous deliveries.

Cesarean section was done 190 times during the year, an incidence of 3.48 per cent., or 1 in 28.7 cases, with a mortality of 4.7 per cent. Death was due to the following causes: general peritonitis in 3, embolism in 2, postpartum hemorrhage in 1, postpartum sepsis in 1, lobar pneumonia in 1, and shock and relaxation of the uterus in 1.

Internal podalic version was done 149 times during the year, an incidence of 2.73 per cent., or 1 in 36 cases, with a mortality of 3 per cent.

There were 13 cases of eclampsia during the year, an incidence of 1 in 419, and a mortality of 23 per cent.

Considering the fetal and infant death rates, in the total confinements of 4,457, there were 5,508 babies, with 4.1 per cent. stillbirths and 2.8 per cent. infant deaths.

In 94 cases or 41 per cent. of the stillbirths the fetus was already macerated at the time of delivery. In more than half of the macerated fetuses (64 per cent.), there was neither clinical nor laboratory evidence of lues in the mother, nor was there any evidence in the stillborn fetus at the postmortem examination. Excluding the 15 positive cases, in the 79 remaining macerated fetuses definite causes were found in 35 cases. Toxemia and eclampsia accounted for 13.

The incidence of cerebral hemorrhage in almost one-third of the operative and one-fifth of the spontaneous deliveries is noteworthy.

The striking figures in one table are the 4.7 per cent. maternal and 6.8 per cent. stillbirth and infant deaths in the cesarean cases, the high baby rate for high forceps (22 per cent.) and the comparatively low rate for prolapsed cord (14 per cent.). The total number of breech cases was 140, which results in an incidence of 1 in 39 cases and a mortality of 26 per cent. Although this is the gross mortality in the breech cases, if the ten macerated fetuses are excluded it becomes 18 per cent. If 3 congenital anomalies are eliminated from the 26 breeches, there is a mortality of 23, or 16.4 per cent. for the breech cases.

[To one who knows the quality of the material treated at the New York Lying-in Hospital these results appear most praiseworthy. The infrequency of syphilis as a cause of stillbirth is also a striking feature of our own statistics. Older writers thought that most macerated fetuses were luetic. One must abstain from comparing statistics. It is absolutely necessary to know thoroughly the individual cases and the methods of compilation.—Ed.]

Maternal Mortality in Massachusetts. This paper by M. Coffin, F. DeKruif, A Southard, and D. Hamblen[9], is intended to give the results of a study of all the deaths occurring in Massachusetts, during the years 1922 and 1923 among women six months or more pregnant, from causes immediately related to pregnancy or childbirth, or from causes in which pregnancy or childbirth was a controlling factor.

No attempt is made to compute mortality rates from these figures. They are not complete, since deaths of women dying before the sixth month of gestation are not included and since deaths occurring after one month postpartum are excluded.

(9) J. A. M. A., Feb. 6, 1926.

The figures are based on the intensive study of the facts gained not only from the death certificates but also from personal conferences with the attending physicians and hospital authorities, and in some cases, with members of the deceased person's family. On the other hand, the registrar's figures contain some deaths which these do not; namely, those occurring in the early months of gestation.

Deaths occurring during the puerperal state from certain complications such as heart disease, acute infections and a miscellaneous group, are included in the figures. They would not be included in similar figures compiled in England and Wales.

[Therefore the statement that the United States stands in this or that position in the list of mortalities of the various countries is without value.—Ed.]

The outstanding facts in this study of 984 maternal deaths in Massachusetts are as follows:

Septicemia, toxemia and hemorrhage, causes of death which may be called generally preventable, were responsible for 58 per cent. of the deaths. The part played by operative intervention with labor, cannot be shown statistically from this series of cases, since records are not available as to the total number of operations performed with and without success. A clear impression was gained, however, by the physicians during the course of this study, that many thoughtful general practitioners have come to the conclusion that this factor of operative intervention is of considerable importance in the total of unfavorable results, even after making allowance for the cases inevitably operative from the beginning. In 591 of this series of 984 cases, operative procedures figured. Lack of adequate prenatal care was evident in 89 per cent. of the cases. Poverty as a cause of maternal mortality did not stand out in this series of cases.

Postpuerperal Morbidity. With a view of stimulating the careful examination of the postpuerperal

woman, H. A. Miller[1] presents a statistical study of 1,000 examinations made as soon as possible after the child was six weeks of age. The cases were taken consecutively from his files. The author's patients were not unfavorably influenced by the use of pituitary extract, which was prohibited during labor; manual or instrumental deliveries were permitted only in the presence of fetal distress, uterine inertia or disproportion. Perineums were repaired immediately, catgut being largely employed.

It is interesting to observe the conditions of the cervices. In a total of 90 per cent. it was at least possible to tell that the cervix had been subject to some slight tearing at the time of labor. That the large majority of cervices are injured even in a spontaneous delivery is shown by the fact that 74 of the 90 per cent. were delivered spontaneously and in the case of multiparas gave no history of the use of pituitary extract or operative delivery. In all forceps deliveries and all versions there was evidence of cervical trauma.

A total of 22 per cent. of the women examined showed some malposition of the uterus. It was very noticeable that this malposition is definitely increased in febrile cases, 17 per cent. of them representing febrile cases. Febrile cases against afebrile cases show a very large increase of subinvolution.

The author's conclusions are as follows: Postpuerperal morbidity occurs much more frequently than is generally supposed. If evenly divided every postpuerperal woman would be a sufferer in at least one particular. A fully dilated cervix is one that is retracted over the fetal head and not one that is spoken of as dilatable. Operative deliveries of any character seem to increase the postpuerperal morbidity and are to be condemned even though we entirely disregard the immediate danger of infection except where absolutely

(1) J. A. M. A., Sep. 11, 1926.

necessary to preserve the life of mother or child. Temperatures during the puerperal period, even though slight, leave in their wake some definite evidence of injury having been done. The now existing postpuerperal morbidity would seem to justify a return to rational nonintervention in the normal woman and the avoidance of all measures to hasten delivery, except in the presence of fetal distress, uterine inertia or disproportion. Attention to cervical injuries will markedly lessen the discomfort of the patient, and in cases of erosion may have an influence on decreasing malignancy. Postpuerperal examinations should be made after each delivery.

[The author re-states truths which we were taught forty years ago. It is unfortunate that our old friend, "Watchful Expectancy," has fallen into the discard in so many places. The specialist in his well-equipped maternity may do things to ease the difficulties of natural labor, but the practitioner, who has to conduct the majority of deliveries, had better hold fast to old, time honored, and well tried principles, and these are indicated by the author.—Ed.]

Retrodisplacement of the Uterus During Pregnancy and the Puerperium. This report by W. C. Danforth and C. E. Galloway[2] concerns only a series of private patients. The authors desire to show the incidence and management of retrodisplacement in women who are not subjected to the necessity of hard work and who have had careful prenatal observation.

In women who gave no history of abortion, either primiparas or multiparas the rule was to do nothing to the retrodisplaced uterus. The authors assured themselves primarily of its mobility and thereafter by periodic examinations determined that it had risen out of the pelvis or that it was prevented from doing so by the promontory. When the latter event occurred or appeared likely to occur, the uterus was manually cor-

(2) J. A. M. A., Sep. 11, 1926.

rected. For this, manual reposition ordinarily sufficed. Where this failed, the maneuver of Schulz was used, the posterior cervical lip being grasped with tenaculum forceps, on which traction was made, while with the vaginal fingers pressure was made upward on the fundus. As soon as the fundus passed the horizontal plane the cervix was pushed backward, the tenaculum removed and the fundus was pushed forward by one hand abdominally while the other kept the cervix back. In the majority of cases this simple means sufficed. After this a pessary of suitable size was placed, and allowed to remain until the uterus was too large to reenter the pelvis. The woman was asked to remain in bed two days and was given ½ gr. (0.03 gm.) of codein at once and another in the evening.

It would seem that the manipulation which is sometimes needed to correct the position of the pregnant uterus might cause abortion. In the series reported, there was but one instance of this. The pregnant uterus is tolerant of trauma to a degree that is sometimes trying when an urgent reason exists for emptying it. This is no reason, however for being other than as cautious and gentle as possible. Manual reposition is needed in about 30 per cent. of the cases of retrodisplacement of the pregnant uterus.

The opinion of the authors is that retrodisplacement is a far less important cause of sterility than is commonly believed. Retrodisplacement is frequently charged with being the cause of abortion, and this is undoubtedly true in a small proportion of cases.

Prevention and correction of retrodisplacement in the puerperium is an important part of practical obstetrics. Some supervision of the process of involution is quite fairly a part of the obstetrician's activity. The authors' plan is as follows: On the third day the woman is allowed a back rest at a low elevation. She is also asked to lie on her face twice daily for ten minutes at least each time or oftener. If engorgement of the

breasts renders this very uncomfortable it is deferred a day or two. This causes the force of gravity for at least a short time to cause the uterus to fall forward. It also helps to dispose of the lochial pool at the upper end of the vagina, which in the face position, tends to flow out. This aids the process of involution which is the process of restoring the uterus to its normal non-pregnant state. On the tenth day the patient gets out of bed, and usually goes home on the twelfth. At the time of discharge from the hospital an internal examination is made to ascertain the position of the uterus. Should the uterus be found retrodisplaced, the woman is asked to assume the knee-chest position twice daily, for at least ten minutes on each occasion. Should the uterus in six weeks still be retrodisplaced, it is reposited manually, and a pessary is given which is worn for eight weeks. Ten days after this has been put in the patient returns to make certain the uterus is held properly by it, again in a month and finally in two months, at which time the pessary is removed.

Of the 1,000 women whose histories form the basis of this report, it was found that 188, or 18.8 per cent. had retrodisplacement while under observation during pregnancy or the puerperium. Of these, 86 were primiparas and 102 multiparas. Of this number, 48 had been examined at some time prior to pregnancy. Thirty-one of these had a retrodisplacement and 17 were normal. In Lynch's report of 761 cases from the University of California Clinic the incidence of retrodisplacement was 42.2 per cent. He states, however, that in a series of 100 private cases the incidence of retrodisplacement was 22 per cent. Apparently there is a greater likelihood of retrodisplacement in women who do hard work or who cannot have an adequate period of rest during the puerperium. Forty per cent. of the patients in the present cases were seen after the uterus was sufficiently large to have risen out of the pelvis. Undoubtedly some of these had had retrodisplacement

at the beginning of pregnancy. Could these be included the number would be somewhat greater.

In fifty-five of the cases there was a retrodisplaced pregnant uterus. Only five of these patients complained of symptoms, in two cases spotting, in two cases bladder pressure, and in one case backache.

In sixteen of these cases, manual reposition and the use of a pessary were resorted to. In the remaining 39 the uterus spontaneously corrected itself. In four of these cases abortion occurred. In a series of 55 retrodisplaced pregnant uteri this is an incidence of abortion of 1 in 13.7. It would not appear that a greater danger of abortion exists when the uterus is retrodisplaced.

Of the 55 patients, 49 reappeared for examination eight weeks after labor. In 13 of these, the uterus was in the forward position. Of these 13, eight were primiparas. An impression exists among the public, and to some extent among physicians that pregnancy will cure retrodisplacements. The opinion of the authors has been that this is an error.

Of the entire series of 1,000 there were 59 who showed retrodisplacements on the twelfth day after labor. These were all advised as to the use of the knee-chest position. Twenty-four of them, on reexamination six or eight weeks after labor, showed the uterus in normal position. Of this group, then, 40 per cent. were relieved by simple postural treatment. The importance of determining the position of the uterus at the end of the stay in the hospital would appear to be evident. The figures, also, seem to show that 6 per cent. of women show retrodisplacement as early as the twelfth day.

At the end of eight weeks there were 144 women who showed some degree of retrodisplacement. In only 19 of these cases was there any definite complaint by the patient.

Eighty of the 144 seen at this time were actively treated. In 17 of these 80, permanent relief was not obtained, as was evidenced by examination at a later date. Pessary treatment therefore cannot be looked on as a permanent cure in all cases. Recurrence of retrodisplacement seems more likely in a woman in whom it existed before or during pregnancy than in one in whom the uterus was normally placed.

Some Comments on the Teaching and Practice of Obstetrics. In a very elaborate and painstaking critical analysis which is difficult to summarize, W. G. Lee[3] calls attention to the fact that the Cook County Hospital (Chicago) has to receive patients in every stage of labor, no matter how serious the condition, and that the total number of neglected cases form a very considerable factor in the operative results. He points out as well that no control is possible over the individual practices of the attending staff on the different services. Under such conditions this analysis and the results shown will conclusively refute the popular belief formerly so wide-spread, that at the Cook County Hospital operative interference is often done without proper indication and is resorted to vastly more frequently than in hospitals under private control. This report shows convincingly that, as a whole, the Cook County services are decidedly conservative and that in general, the indications for major operations are definite and valid.

Statistical Survey of Obstetrics in Pasadena, as an Example of Obstetrics as Practiced in Cities of California, January 1, 1924, to December 31, 1924. This study by J. S. Hibben[4] shows that the maternal, stillborn, and infant mortality rates in Pasadena compare favorably with other cities of the same population, and are evidence that adequate prenatal care is being given patients. Seventy-five per cent. of deliveries being in

(3) Surg. Gynec. & Obst., Jan., 1926.
(4) Am. J. Obst. & Gynec., December, 1925.

hospitals in Pasadena, shows that the public is being educated to advantages of hospitalization in maternity cases. The small number of cases delivered by cesarean section is evidence that most Pasadena physicians are practicing conservative obstetrics. Osteopaths, chiropractors, midwives, and Christian Scientists delivered only 48 cases out of a total of 1,414 births.

The maternal mortality per 1,000 confinements was 4.3 for Pasadena and 5.1 for the state. The stillborns per 1,000 confinements were 29.1 and 28.9 respectively and the infant deaths per 1,000 live births were 46.7 and 67.1 respectively. There were no maternal deaths from septicemia. Women of Pasadena and California, in addition to adequate medical care, cannot help having normal prenatal period, normal deliveries, normal puerperium, and healthy babies on account of the very invigorating climate where most babies are breast-fed, thus reducing infant morality.

[If the last statement is true, some method must be invented to bottle this wonderful climate and distribute it over the rest of the United States. The Editor wishes to place an order for the first 1,000 cases, price, no consideration.]

The Development of Prenatal Care in Detroit. In 1920 the United States Census Report showed a maternal mortality rate of 8 per 1000, the result of childbearing. During the same period in Detroit there were 50.3 stillbirths per 1000 living births and 43 infants out of 1000 born alive, died during the first month of their lives The maternal death rate from childbearing in Detroit has averaged 6.75 for a number of years. This appalling death rate intimately associated with childbearing is, according to W. E. Welz[5], sufficient to demonstrate that childbearing is a public health problem.

The City of Detroit, through its Department of Health, is making an effort to decrease maternal and

(5) Am. J. Obst. & Gynec., May, 1926.

infant mortality which results from neglected pregnancy and delivery. This department is reducing maternal and infantile mortality and morbidity among the indigent of the city. This work is unique in that the municipality assumes the responsibility for bringing live, healthy babies into the world for its indigent classes which are usually neglected at that time. [Unique? —Ed.]

In 1911 the Department of Health of the City of Detroit started a prenatal clinic in an effort to reduce infant mortality. Prenatal clinics have been established by the city in various poor sections of the city. Today there are seven such clinics.

During the years 1922, 1923 and 1924, maternal death rate from all causes following confinement for the entire city was 6.75 per 1000 deliveries, while among the women who attended the clinics, the rate was only 3.5 per 1000, a reduction of about 50 per cent. The clinics care for 6 per cent. of all pregnant women in the city.

In the three years' period there were four deaths from eclampsia among 5,032 mothers cared for in the clinics. Prenatal care reduced this cause of death from 1.06 per 1000 for the entire city to 0.79 per 1000 for clinic cases. Death from eclampsia was reduced 24 per cent. even though some of the clinic cases are not in complete control.

Fifty per cent. of the maternal deaths from childbirth were due to sepsis. In the entire city the rate of maternal deaths from sepsis alone for these years has been 3.24 per 1000 births. Among the mothers who attended prenatal clinics, the rate was 0.79 per 1000 births. This reduction of 75 per cent. in maternal deaths due to puerperal sepsis has been accomplished mostly through adequate provision for delivery for all clinic patients, and hospitalization for all abnormal cases.

The incidence of stillbirths for the entire city during that period was 51.8 per 1000 living births, and 35.6 per 1000 for infants whose mothers had prenatal care. This was a reduction of 16 stillbirths per 1000 living births, the result of prenatal care.

[What is a stillbirth?—Ed.]

Over 30 per cent. of all women attending these clinics have some intercurrent disease or abnormality which might affect mother or child or both adversely, so all maternal diseases are diagnosed prenatally and cared for as soon as possible.

During the past 4 years, 5,440 pregnant women were cared for at Station 1 of the Department of Health. Seven hundred seventy-eight (14 per cent.) of these were syphilitic. The high incidence of this disease is due to the fact that the majority of the clinic cases are colored women. It was possible to follow 670 (86 per cent.) of the entire number of luetic mothers through pregnancy, labor, and postnatal periods to six weeks after delivery when the final postnatal examination of mother and infant was made.

Fifty-six per cent. of all luetic mothers give positive luetic histories. Even with negative blood Wassermann report, 14 per cent. of these syphilitic mothers were diagnosed by means of history and physical findings.

[Does a positive Wassermann during pregnancy always mean syphilis?—Ed.]

As soon as a positive diagnosis of syphilis is made, the expectant mother is sent to the Venereal Clinic of the Department of Health for intensive treatment with arsphenamin. This is done regardless of the period of pregnancy. It is desirable to diagnose and treat syphilis in the pregnant woman within the first sixteen weeks of pregnancy as it is believed that transmission occurs only through the placenta and a minimum of three months is required for that transmission.

There was a definite reduction of 148 infantile deaths per 1000 births among syphilitic patients as a result of treatment during pregnancy.

But adequate prenatal care does not end with the attempt to prevent transmission of syphilis to the newborn. It teaches the mother the dangers of syphilis, the possibility of transmission and the need of treatment to produce a cure. The other members of the family, especially the husband and children, are referred to clinics for diagnosis and care. Always the mother is given an explanation of the disease as far as she can understand, and the danger of transmission is pointed out to her.

In Station 1 of the Department of Health during the past two years, 211 (6.6 per cent.) of 3,186 pregnant women were found to have heart lesions. Most of these women had never had a thorough physical examination before, and most of them had never had either a diagnosis or any instruction as to the hygiene necessary to prolong life.

There was a primary infant mortality of 8 per cent., the result of maternal heart lesions. There were two maternal deaths from heart lesions and two mothers died suddenly several months after delivery.

In three years, 39 tuberculous women were discovered in 4,520 pregnant women. This incidence of 8.6 per 1000 is high, due to the fact that a number of tuberculous women are referred to this clinic from the Tuberculous Clinic of the Department of Health.

It is believed that there is greater danger to the mother from an induced miscarriage than from a normal delivery at term. [In what cases?—Ed.]

During two years, 41 premature infants died in the neonatal period. This is 60 per cent. of the total 68 deaths in this period. Almost half of the neonatal deaths of premature infants were due to syphilis. So the principal means of reducing neonatal deaths is by the prevention of premature births. This is done by

the treatment of syphilis, control of toxemia, effort toward the prevention of infections, providing proper nutrition for the mother, as well as lessening her work during the latter months of pregnancy, and preventing conditions generally which tend to induce premature labor. [Excellent.—Ed.]

In early pregnancy proper nutrition is essential in controlling hyperemesis. In the last 8,000 prenatal cases at Station 1, no therapeutic abortion has been advised for hyperemesis gravidarum. This was largely the result of proper dietary instructions. The majority of toxemias of late pregnancy can be controlled through diet and elimination.

While the neonatal period is accepted as the first four weeks of life, the Detroit clinics use six weeks for the period of tabulating the last infantile records of prenatal care. As the last examination of the mother is made at the termination of involution six weeks after delivery, it is easiest to examine and record the infantile condition at the same time.

Complete records are being made of the prospective health of the individual even before his birth. This is a stable foundation for the health registration of the individual. All subsequent health supervision must be based on this first and most important record which antedates birth and extends through the most dangerous (neonatal) period of life. Eventually a health pedigree will be worked out for the individual, starting at the prenatal record, going through infantile, pre-school and school records, to further records to be made at maturity.

In the care of the expectant mother, cooperation is necessary with all other agencies which may be of service to her or her child. The most common need is dental care, as over 80 per cent. of all women attending prenatal clinics in Detroit, require immediate dental service. So far as possible these women are referred to the nearest dental clinic for care. All tuberculous

women and those in whom the disease is suspected are sent to the nearest tuberculous clinic for diagnosis and care. Those needing hospitalization are placed in sanitoria as soon as possible. Patients with venereal diseases are sent at once to the Municipal Venereal Clinic for care.

It is estimated that approximately 20 per cent. of the expectant mothers in Detroit receive adequate prenatal care. These include the wealthy who pay for and receive good care during pregnancy, and the poor who attend free clinics. The 80 per cent. who receive inadequate or no prenatal care belong to the great middle class of working people, the fathers being mostly factory workers who can pay for this care. The reason that this 80 per cent. is neglected in pregnancy is twofold: neglect on the part of the family physician and negligence on the part of the expectant mothers.

[This is a most valuable and stimulating report of accomplishment,—worthy of imitation everywhere.—Ed.]

The Maternity Ward of the General Hospital. This opportunity of presenting his ideas on the construction of maternity hospitals to a large number of hospital superintendents, architects, nurses, medical men and laymen is one that J. B. DeLee[6] has wished for for many years and particularly in the last few years, for he has observed that certain fundamental principles underlying the safety of the childbearing mother are being forgotten and neglected in modern hospital building.

It is not his intention at the present time to give his views on the actual planning of a lying-in hospital. The general laws of hospital construction apply only in part to the maternity hospital. Obstetric technic has become so specialized that the building must be constructed to fit it, and further, the planning must comprehend a twenty-four hour continuous service in

(6) Modern Hosp. Year Book, Sixth edition, 1926.

the birth rooms and nurseries, an augmented night service in the wards, and a double capacity laundry. These matters may, perhaps, be discussed in a future paper. This article is to deal with the fundamental principles of the modern maternity.

Defects Common in Maternity Wards.—Although he is not a hospital superintendent DeLee has had intimate knowledge of the inner workings of eight large institutions, one a special, independent lying-in hospital. All of these he has watched grow for thirty-four years. During this time he has enjoyed an active consultation practice in many other hospitals and as a background for this institutional experience he had a large service in an out-maternity or obstetric dispensary, and also a busy private practice in homes. It is therefore possible for him to make comparisons between various kinds of obstetric work and to draw definite conclusions.

With distressingly few exceptions the maternity wards of general hospitals are subject to the following criticisms:

1. The maternity is the neglected portion of the hospital. When the building is enlarged to meet the demands for more room for surgery and medicine, the old wards are usually repainted and made into the lying-in department. When the surgery is fitted out anew, its discarded equipment is passed on to the maternity. This statement applies to the majority and is no reflection on a very small but commendable minority of institutions.

2. In most of the new hospitals being built the least desirable floor, or least favored position is assigned to the obstetrician. Although operations of greater magnitude than the majority of surgical operations are performed in it, the delivery room is seldom built and equipped with the space, the lighting and the operative facilities of the surgery. Anything seems to be good enough for the obstetrician in nearly all hospitals.

3. The service rendered the patient in the obstetric ward is nearly always poorer than that in the rest of the hospital. Few lying-in wards are large enough to warrant the employment of a permanent resident. The interns have a rotating service and only a small portion of their time is spent in the maternity. Before one has fully learned the technic he is replaced by another, as ignorant as himself. The same is true of the head nurse and the nurses in training. Few hospitals employ enough supervisors to teach the rapidly changing student nurses. A nurse will spend six to nine months in the operating rooms but is expected to learn the more complicated obstetric technic in three or four weeks. Not one hospital in ten furnishes enough anesthetists to supply the need in the obstetric wards; they rely on the fallacy that women in labor are immune to the dangers of general anesthesia.

4. The responsibilities of surgical operations have been fairly well standardized and practitioners recognize their limitations and conform to the requirements of the hospital. In the obstetric room each man does as he pleases, general practitioners, surgeons, even eye and ear specialists, "accoucheurs on occasion," carry on as they were taught (or not taught) thirty years ago, trusting to luck or the skill of a downy intern who supplies with nerve what he lacks in knowledge and experience.

5. The aseptic technic is not insisted upon as it is in the surgery. Visitors enter the delivery room without gowns, the accoucheur seldom wears a mouth cover, the supervisor combines her general hospital duties with those of the confinement room and while instructing the junior nurses sometimes contaminates the sterile field with droplets of saliva; in short, the aseptic technic is slack throughout.

These are all great evils and they swell the mortality and morbidity of the mothers and babies in the United States. There is one evil, however, that surpasses all these and that makes the author declare that the ma-

ternity ward in the general hospital of today is a dangerous place for a woman to have a baby. The peril lies in the infective influences which emanate from the wards devoted to medicine, surgery, gynecology, pediatrics, the laboratories and the autopsy room.

DeLee is deeply conscious of the grave significance of the accusation implied in this declaration, and he makes it only because a vast experience has convinced him of its truth.

Obstetricians for the last ten years have become more and more concerned about the persistent high maternal death rate, and the undiminished morbidity of both mothers and babies. The women whose lives are being saved by proper prenatal care are dying of puerperal infection after delivery.

The menace of the general wards of the hospital to the maternity was brought home to the author thirty-three years ago when he had his first experience with an epidemic of puerperal infection. In rapid succession four women developed septicemia; of these, one died and one had pelvic abscess. In addition to the four, several milder cases ran short courses.

In common with other surgeons he hoped that by refining the aseptic technic, by using rubber gloves, by keeping the puerperae apart from the general medical and surgical cases, he could prevent the occasional infection and certainly avert epidemics.

This hope and these endeavors have proved vain. Within the last few years the frequency of individual cases of puerperal infection has grown and the number of serious epidemics has increased in dismaying proportions. The author has personal knowledge of the following instances, all occurring within the last three years and all in good hospitals:

General hospital, class A, maternity ward all on one floor, 10 cases of puerperal infection, 6 severe, 3 deaths.

General hospital, maternity patients on same floor as surgical, 5 mothers seriously ill, 6 babies (1 twin); 3

mothers and 3 babies died of infection. (This is only part of the story, the rest was concealed).

In June, 1925, an article appeared in the American Journal of Obstetrics and Gynecology detailing six cases of fatal peritonitis following apparently clean operations. Bumm mentions such cases as occurring in Berlin; Zweifel refers to cases in Leipzig.

The Germans have long appreciated the dangers of hospital contagion. Sippel, declaring that epidemics of peritonitis still frequently occur in German hospitals in spite of aseptic technic (translation of article to be found in 1924 *Year Book of Obstetrics*), demanded that special wards and operating rooms be given to clean cases.

In May, 1925, at Washington, the maternal welfare committee of the American Gynecologic Society, under the chairmanship of Professor F. L. Adair, presented a resolution which was adopted unanimously. This committee has been functioning several years, its object being to find out why the mortality continues so high among American mothers. As one potent cause of death they have found puerperal infection in general hospitals. The resolution follows:

"It is resolved that as a measure to promote better care of pregnant women, with a corresponding reduction of maternal and infant morbidity and mortality due to septic infection in hospital practice, the Joint Committee on Maternal Welfare advocates a detached and separate maternity service, with its own personnel, in all general hospitals admitting pregnancy cases, and also recommends as an ultimate ideal that physically separated buildings be provided for this purpose when practical."

At the 1925 meeting of the Hospital Association of the State of Illinois, H. L. Fritschel of Milwaukee, made the recommendation "that the maternity hospital should be a separate unit distinct from the general hospital." Although DeLee has been preaching this doctrine for

thirty years, he was not a member of either of the committees presenting these recommendations.

How, in these modern aseptic days, can this deplorable state of affairs be explained? Are we still ignorant about the habits of bacteria? Are there other factors besides bacteria involved? Must we accept the theory, discarded by the majority of surgeons, of air-borne infection? Yes, DeLee believes it must be accepted, but only as one of the means for the transference, one of the "carriers" of infectious agents from one part of the hospital to another. The most frequent carrier is the doctor, the intern, or the nurse, including the general supervisors whose duties take them over the whole institution, the bacteria being either on the hands or in the throat. Next in point of risk is the laundry. Insufficiently washed and undisinfected linen distributes infection all over the hospital. Next in importance are the servants, especially the cleaners, who transport on their mops and brushes bacteria from septic operations and from bacteriological laboratories to clean departments.

Is it a far-fetched assumption that pus, or germ-bearing liquids spread on the floors may dry up, and be ground up by traffic, and in the form of fine dust may be disseminated throughout the institution by swirling air currents, or ventilating flues? Further, since we know that many bacteria retain their vitality and infectivity for hours or days (the tetanus spore, for years), is it too much to believe that bacteria carried to the patient in this dust and settling on the sterile field of operations, on the catgut, on the operator's gloves, on the open wounds of surgical cases, on the vulva of the parturient woman, on the open wounds of the perineum, on the cracks in the nipples or on the baby's navel, may set up minor and grave infections?

It is human to try to evade blame and it is natural for hospital authorities to cover errors which might reflect on the technic or involve the operator or the

institution in a damage suit. Then, too, surgeons hold different opinions regarding the incidence and operation of infective factors, grounded in a more or less lucky experience, or in more or less careful observation, or in a more or less treacherous memory.

To concentrate our attention now on the maternity ward in the general hospital, while it usually suffers from the neglect caused by the general disesteem in which obstetrics is held by the profession and the nurses, it is also exposed in a very acute degree to the danger of infection transferred from the surgical and medical wards, the bacteriological laboratory and the postmortem room. This danger, omnipresent for all cases, is still further augmented by the predispositions of parturient and puerperal women. "A pregnant woman, *ipso facto*, has a tendency to die," said C. E. Douglass, and the tendency lies, among other things, in a susceptibility to infection. This fact became strikingly apparent during the influenza epidemic, in which the mortality of gravidae reached as high as 60 per cent.

Difference in Technic.—In addition to this general predisposition there are local conditions which are significant. Let us compare surgical and obstetric work. The surgeon makes his wound, and a small one, in a sterile operative field and exposes the tissues for only a short time, minutes, or a few hours at most. Furthermore, he closes and covers the opening at once, thus protecting it until nature has sealed it. On the other hand, the obstetrician operates in an unsterile field, *inter feces et urinam*, and has a very large expanse to watch. A labor lasts hours, sometimes days, and the future operative area lies open to contamination all this time. During the final stage of the operation the field, an unquiet one too, lies exposed from one to six hours. The obstetric surgeon cannot close and cover the wound on the completion of his operation, it lies exposed to outside influences all the

time, it is disturbed by the attentions necessary to bowel movements and urination. It is an open wound as long as the patient remains in the hospital. The breasts, too, if the nipples are cracked, are exposed to the same dangers.

The umbilical wound of the baby suffers from identical disabilities and therefore we find this the atrium of numberless infections of the new born.

Let no one say that these dangers are exaggerated; over 5,000 women die of puerperal fever every year, in the United States; over 100,000 women sicken of it and are left more or less permanent and wretched invalids. The toll of the babies cannot even be guessed.

What can be done about it? A great deal. In the first place, let the full surgical dignity of the obstetric case be recognized and properly evaluated, and it will naturally follow that everything in the maternity will be done with at least the same thoroughness as in the surgery. Architecturally the confinement room will be as well built and as properly adapted to the work done in it as are the operating rooms. The equipment will be of like quality and completeness. The staff will be the equivalent in number, the interns and nurses, and the supervisors will be equal to those in the surgery.

The aseptic technic should even surpass in thoroughness and fineness that of the surgery, for reasons already mentioned. No detail considered necessary in the operating rooms may be omitted from the confinement room.

In addition to all this the maternity should be in a separate, detached building with its own laundry, kitchen, and quarters for help. In large institutious the problem is easy of solution; for smaller hospitals the moral responsibility may be met by building a maternity cottage adjacent to the main building. The flexibility of the maternity should be such that one never has to permit the puerperae to overflow into the general wards of the hospital.

Cases of infection develop in every maternity no matter how carefully conducted, and, if kept in the building, they are a menace as great, if not greater, than are such cases in the surgical ward. Such infections are to be transferred to the main building, to a special ward set aside for and properly adapted to the handling of all septic cases—those from the surgical and medical wards as well as those from the maternity, or they may be taken to a detached isolation pavilion.

All independent lying-in hospitals have a special isolation ward; some are fortunate in having a special isolation pavilion. This last should be the rule, and would be the ideal for the large maternity connected with the general hospital. Every maternity should have an "observation room" for suspected mothers, and an isolation nursery fitted with cubicles for suspected babies. These are way stations to the septic pavilion. The latter has facilities for the proper isolation of babies affected with pemphigus, pneumonia, diphtheria, pustulosis or thrush, as well as for infected mothers.

A proper modern maternity, therefore, should have: (1) Wards and rooms for clean puerperae; (2) nurseries for clean babies; (3) a receiving room near the entrance for the distribution of the cases and the separation of the infected ones; (4) observation rooms for suspect mothers; (5) observation nurseries with cubicles for suspect babies; (6) a disconnected isolation pavilion provided with (a) individual suites (room, bath, toilet, lavatory and sterilizer); (b) clean nursery for the babies of infected mothers; (c) private rooms or large nursery with individual cubicles for infected babies. All the rooms of the isolation unit should have access to a porch, and should be so arranged that infected linen and dressings may be removed from the outside, and the latter destroyed in incinerators not within the building.

There are many who believe that such physical, or architectural isolation of the maternity cases is not needful, and also that the septic case can be treated, safely for its neighbors, in a clean ward, by so-called administrative isolation (separate utensils, gowns, instruments, rubber gloves and disinfection of waste).

If the high pressure sterilizers always disinfected their contents, if the laundry always washed and boiled the linen and blankets, if sore-throated doctors, nurses and servants were always isolated, if the nurses and doctors always disinfected their hands between cases—if such and other godlike qualities existed on this earth. the author might believe it possible to mix clean and septic cases with safety. Since, however, frailty, ignorance and deliberate carelessness are human faults which will not disappear until the millennium, it behooves those on whom the responsibility for human life rests, to place natural physical barriers between the danger and its prey. The parturient will then enjoy the protection of natural laws.

[The Editor has reprinted his article here because he feels the matter is so important that it should have wide circulation. The number of women having their babies in hospitals is increasing by leaps and bounds—so is the mortality from childbed infection. In view of what he has written above this is certainly more than a coincidence. If the hospitals guaranteed the women safety from infection, and so many are now confined there, we should see a decrease, not an increase, of the deaths from puerperal fever. The Editor is convinced that, if all the truth were known, the conditions would be startlingly worse than he has depicted.]

The Physician's Part in a Practical State Program of Prenatal Care. According to a committee which recently drew up some standards of prenatal care for the Children's Bureau, "Prenatal care is that part of maternal care which has as its object the complete supervision of the pregnant woman in order to pre-

serve the happiness, health, and life of the mother and child. Therefore all pregnant women should be under medical supervision during their entire pregnancy, for it is only by careful routine prenatal care that pregnancy and labor can be made safer.''

While we are striving to perfect and carry out universally the care of the pregnant woman, we must, according to F. L. Adair[7], also begin to enlarge our conception of prenatal care, or coin another name, such as anteconceptional care or pre-embryonic care.

Prenatal usually implies during pregnancy, but one is led to consider when prenatal care begins, and though we may not accept the name, we must recognize the fact that causes operate to affect the offspring for good or ill prior to the fertilization which leads to the ultimate development of an individual.

There is the specialist in obstetrics and the general practitioner or inexperienced obstetrician to consider. The experienced specialist should really not care for the routine and normal obstetric cases, but reserve his energy and ability for the more trying and hazardous cases. On the other hand, the practitioner and inexperienced obstetrician should not hesitate to secure the benefit of greater experience for the welfare of their patients.

The relation of the practitioner to clinics is of great importance. Many patients cannot afford to pay an adequate fee for prenatal, natal and postnatal care. Some cannot pay for any of this service and should receive this care in a free or part-pay clinic. Other patients are able to pay for part of the service and can employ a physician for this portion of their case. There should be the fullest cooperation between the physician and these clinics to the ultimate benefit of all concerned. There should be helpful teamwork between those who practice obstetrics and the maternity wards of hospitals so that complicated cases can be

(7) Am. J. Obst. & Gynec., August, 1926.

promptly hospitalized and cared for properly before it is too late to prevent disastrous consequences. Hospital facilities for the care of maternity patients have been and are woefully inadequate. Physicians should cooperate in plans to develop and improve such hospital facilities not only in large centers of population, but even more important, in counties and small cities.

Teachers and teaching institutions are indispensable in the carrying out of any state plan. Those already in practice need to be taught and kept abreast of obstetric progress. Specialists must be taught and trained through years of instruction. Practitioners must be prepared during the undergraduate course and the intern year. This means good teachers who are well trained and with adequate time and energy to make teaching their main work. It means also adequate teaching hours for obstetrics, adequate equipment, and patients who can be used clinically for demonstration without harm and discomfort to themselves or offspring.

There must, therefore, be close cooperation between officials and practitioners and the medical profession. The laity and physicians must understand each other. The former must realize that careful preparation and years of study are necessary qualifications and the latter must know that the people wish real service which gives results. Obstetric practitioners must cooperate with each other and men must realize their limitations and recognize the qualifications of others along special lines. All should strive for better institutional facilities and organizations for maternity care. There should be closer contact between practitioners and teachers and teaching institutions. Investigators should be encouraged and supplied with material for study from all available sources. We should all realize the value of statistics and especially vital statistics and cooperate to the fullest extent in securing accurate and valuable reports.

[These are all ideals and well worth striving for. We are progressing toward them, slowly.—Ed.]

Standards of Prenatal Care. The following outline* was approved by the Joint Committee on Maternal Welfare of the American Gynecological Society, American Association of Obstetricians, Gynecologists and Abdominal Surgeons and American Child Health Association.

Prenatal care is that part of maternal care which has as its object the complete supervision of the pregnant woman in order to preserve the happiness, health, and life of the mother and child. Therefore all pregnant women should be under medical supervision during their entire pregnancy, for it is only by careful routine prenatal care that pregnancy and labor can be made safer.

I. The physician at the first visit should obtain the following data and record the facts:

A. Patient's past history:

1. Diseases. Question particularly as to the following:
   - *(a)* Tuberculosis or exposure to tuberculosis.
   - *(b)* Scarlet fever.
   - *(c)* Tonsillitis.
   - *(d)* Rheumatism.
   - *(e)* Diphtheria.
2. Surgical conditions and accidents, especially abdominal and pelvic operations.
3. Menstrual history—cycle, amount of flow, duration, and pain.

B. Character of previous pregnancies and labors. Secure the following data of previous pregnancies in chronological order:

1. Date of termination.
2. Period of gestation.
3. Complications during pregnancy.
4. Labor.
   - Onset—spontaneous or induced.
   - Character.
   - Duration.
   - Termination of labor.
     - Spontaneous or artificial.
     - If artificial, what method.
   - Other complications.

(*) Am. J. Obst. & Gynec., September, 1926.

5. Puerperium.
   Infection.
   Hemorrhage.
   Operations following.

6. The new-born.
   Alive or dead at birth.
   If dead, macerated?
   Premature or term.
   Breast fed—yes or no. Duration.
   Baby alive now? If dead, give cause of death.

C. Present pregnancy:

1. Date of last menstruation and character thereof.
2. Nausea and vomiting and quickening.
3. Estimation of date of delivery.

II. Then proceed to—

A. Physical examination.

1. Taking and recording of the systolic and diastolic blood pressure, temperature (preferably p. m.), pulse, and weight.
2. Skin, nutrition, head, mouth, neck, chest, heart, lungs, breasts, extremities.
3. Abdominal examination, palpation, auscultation, mensuration.
4. Vaginal examination. No vaginal examination during the last month of normal gestation without strict aseptic precautions. Rectal examination should be substituted.

(a) The necessity of a vaginal or rectal examination is insisted upon—

(1) To determine the existence of a pregnancy.
(2) To determine the position of the uterus.
(3) To discover any pelvic tumor.
(4) To determine the presence of venereal disease, and if suspected to take smears.
(5) Speculum examination of the cervix and vagina is advised in early pregnancy if indicated.

(b) In presence of vaginal bleeding at any period of gestation only rectal or aseptic vaginal examination should be made.

5. Pelvic measurements.
   (a) Intercristal.
   (b) Interspinous.
   (c) External conjugate.
   (d) Diagonal conjugate.
   (e) Transverse diameter of the outlet.
   (f) Palpation of pelvic contours, promontory, sacrum, coccyx, ischial spines, arch, tuberosities.
6. Taking of blood for Wassermann reaction.
7. Urinalysis.
   Specific gravity. Albumin. Sugar.
   A microscopic examination of the sediment is advisable as a matter of routine, and it is a necessity if albumin is present. If there is any evidence of trouble, a 24-hour specimen should be secured.

III. If pregnancy is determined, then give minute instructions to the patient in the hygiene of pregnancy.

NOTE.—Refer to publications of the United States Children's Bureau, Washington, D. C.—Prenatal Care, Publication No. 4, and What Builds Babies, Folder No. 4—and to publications of State department of health.

A. Diet.
B. Exercise, rest, sleep, and recreation.
C. Clothing, including shoes.
D. Baths and care of the skin.
E. Care of the bowels.
F. Care of the kidneys.
G. Care of the teeth.
H. Care of the breasts.
I. Intercourse during pregnancy.
J. Maternal impressions.
K. Hygiene of the home and preparation for home delivery.
L. Mental hygiene.

Patients should be examined by a physician at least once a month during the first six months, then every two weeks or oftener as indicated, preferably every week in the last four weeks. A properly qualified nurse working in conjunction with a physician may assist in the observation of the patient. At each visit to the physician the patient's general condition must be investigated, blood pressure taken and recorded, urinalysis done, pulse and temperature recorded, and the weight of the patient taken if possible.

External pelvimetry is only suggestive. It alone does not determine whether any disproportion is present.

Abdominal examination should be made at each visit and the height of the fundus determined at this examination. Abdominal palpation in the eighth and ninth months will show whether or not there is any obvious disproportion between the head and the pelvis. Malpositions can be determined and may be corrected. Further information as regards descent and fixation can be obtained by rectal examination.

In a primigravida, if the presenting part two weeks before the estimated date of delivery is not well in the pelvis, the physician in charge should determine, so far as is possible, whether any disproportion between the pelvis and the baby exists. If a disproportion is diagnosed in any case special care should be taken to avoid vaginal examinations immediately prior to or after the onset of labor. This precaution is wise because of the danger of serious infection should operative procedures later become necessary.

Every patient requires careful individual study. If the prospective labor offers a probable chance of being a difficult one, the patient should be sent to a well-equipped hospital for delivery.

Pregnancy is a physiological condition, but there is no condition which so quickly may become pathological. It is therefore necessary to instruct each patient at her first visit to report at once to the physician anything that may affect her well-being, especially the following symptoms:

1. Obstinate constipation.
2. Shortness of breath.
3. Acute illnesses, especially colds, sore throat, and persistent cough.
4. Persistent or recurring headache.
5. Recurring nausea or vomiting.
6. Visual disturbances.
7. Dizziness.
8. Pain in the epigastrium.
9. Edema, especially of face, hands, and ankles.
10. Changes in the urine or in the type of micturition.
11. Severe pain in the lower abdomen.
12. Vaginal bleeding, even the slightest.

In case of vaginal bleeding or low abdominal pain the patient must be instructed to go to bed at once and to send for her physician. When bleeding from the vagina occurs its source must be determined by examination. When hemorrhage appears imminent the patient, if possible, should be removed to a hospital, but if vaginal examination is necessary it must be done under aseptic precautions. Where a hospital is not available, means must be at hand to control the possible severe bleeding that may arise.

If the patient develops a toxemia in the course of her pregnancy it is only by careful medical supervision and treatment that an eclamptic condition can be prevented. Eclamptic convulsions are in the majority of cases preventable, but only by constant vigilance combined with cooperation between the patient and the physician can the disastrous results which occur throughout the country be diminished.

If the patient is to be delivered by a licensed midwife, she should have the advantage of the same prenatal care to which all prospective mothers are entitled. If there is doubt about the patient's having a normal delivery she should be transferred to a doctor or to a hospital.

Only by careful study of each case is it possible to determine whether the patient should be allowed to stay at home or be sent to a hospital. By this individual study the number of vaginal examinations during labor may be cut to the minimum and the terrible toll of death from sepsis be much lowered.

It is only by the early and repeated examination of the prospective mother that the premature termination of pregnancies, the stillbirths, and many diseases and deaths of the new-born can be reduced. By the same methods the mothers can be spared much distress and disease, and many lives can be saved which would otherwise be lost from toxemia, accidents of pregnancy and labor, and infection.

Report of the Joint Committee on Maternal Welfare. During the past year the work of the Committee on Maternal Welfare[8] has been prosecuted as it could best be done, handicapped by the conditions which have been encountered.

George W. Kosmak, editor of the American Journal of Obstetrics and Gynecology, announced the inclusion of a Department of Maternal Welfare to be established by the Journal and outlined the scope of the undertaking. This is the first effort made by any medical publication to stress in a definite way the activities of the Joint Committee and the promise of this publicity is hailed with delight.

It has always occurred to the members of the committee of which G. C. Mosher is chairman and H. Schwartz and G. W. Kosmak are the other members, that surgery in general which, for the average practioner is a matter of diagnosis and of minor emergencies, has been accorded an importance quite out of proportion with the other lines of work that he will have in his future practice. In relative value the ratio will be about as follows: medicine 50 per cent.; obstetrics 35 per cent.; minor surgery, fractures, life insurance examinations, etc., 15 per cent.

With this thought in mind in order that the schedule for the hours assigned to the various branches of the curriculum for this year could be made available for a comprehensive study of the comparative limits of the various required and optional courses, the Chairman asked the Secretary of every medical college in the United States to send him a copy of the school's catalogue announcement. Since a large proportion of the colleges responded, the figures as presented are approximately accurate. A careful analysis agrees with the report of Rowland, that the time allotted in the college to obstetrics is about 4 per cent.; and

(8) Am. J. Obst. & Gynec., April, 1926.

18 per cent. is the general average of the hours for surgery, exclusive of the surgical specialties.

The Committee is not finding fault with the teachers of surgery for securing these hours of instruction. The contrast between the practical need, in the student's course in obstetrics, which is to become so large a volume of his life's work, and of major surgery, of which the general practitioner will make so little use, is the point emphasized. He must know his obstetrics. It comes in his daily problems and the end of each emergency may be fatal. The glaring fault of high morbidity and mortality in obstetrics, as Lynch, Newell, Davis and Rowland argue, is that the neophyte in medicine is self-taught in obstetrics.

The plea of the committee is that less time be devoted to those branches of studies more or less cultural, in the curriculum, and more hours given to this one subject, which does not now have the attention its importance makes essential. It is not expected that the general practitioner will do cesarean section, or other operative obstetrics, but he will do many phases of the work which demand a thorough apprenticeship.

The specific recommendations of the Committee are that the Association use its influence to increase the amount of obstetric teaching so that instruction in the third year should consist of at least three hours a week, throughout the year. This to include anatomy, physiology of the pelvic region, with a study of normal pregnancy and the mechanism of labor. Consideration of version, breech extraction, forceps delivery, and so forth, should not be included, but these should be taught in small classes by use of the manikin. History taking, diagnosis, and examination of the clinical patient demands at least 30 hours. During the last half of the third year the student is to attend, as an observer, fourth year lectures on clinical obstetrics. The fourth year group work in physical examinations in the hospital wards and dispensary are supplementary

to the drill in manikin work with which it should go hand in hand. It is imperative that the student should see as much operative obstetric delivery as possible. By visualizing the actual demonstration, he is brought face to face with the difficulties, before he is forced to assume the responsibility of the personal management of the abnormal type, dependent on his own unguided resources. Obstetrics should occupy in this scheme of curriculum 15 per cent. of the hours of the last two undergraduate years in the medical school.

There are several subjects which preeminently demand consideration by the Association. The committee has chosen "The Teaching of Obstetrics" as the topic to emphasize in 1925-1926 as logically following the survey of this last year.

[It is going to be hard to convince all the other professors that obstetrics requires more time. They all feel the same way about their own specialties.—Ed.]

An Analysis of the Work of the Obstetric Clinic of the Johns Hopkins Hospital for the Year 1924 and a Proposed Scheme for the Ready Indexing of Obstetric Records. The most feasible working plan of analyzing and presenting statistics appears to E. L. Stone and W. E. Sisson[9] to consist in the construction of a condensed chart in which the unessentials are omitted and emphasis is placed on the significant features of clinical importance, so that the material contained in each week's histories can be quickly checked, filed away and the 52 sheets condensed at the end of the year into a collective summary. The scheme devised by the authors is presented.

During the year 1924 there were 954 deliveries and 120 cases of abortion at the Johns Hopkins Hospital. The percentage of operated term cases to the total number of cases was 22.8 per cent. Among fifty-six patients in whom labor was induced the gross fetal mortality was 27.5 per cent. Among the 954 deliveries there were 51

(9) Am. J. Obst. & Gynec., November, 1925.

cesarean sections, an incidence of 5.3 per cent. One mother died (2 per cent.) and 5 children died (9.8 per cent.). In a series of 25 versions and extractions the fetal mortality was 48 per cent.

In the entire series there were 10 maternal deaths (0.8 per cent.). Five of these deaths were from puerperal infection and peritonitis. Five of the ten patients were admitted in extremis from outside sources. The gross fetal mortality was 4.87 per cent. For eight cases of abruptio placentae, the maternal mortality was 12.5 per cent. and the fetal mortality was 75 per cent. For eight cases of placenta previa the corresponding mortalities were 12.5 per cent. and 87.5 per cent. Eleven cases of eclampsia were treated without a single maternal death and a fetal mortality of 33.3 per cent.

[It is of the utmost importance for us obstetricians to get together and devise some kind of scheme for a universal tabulation of statistics. Until this is done it is futile and unfair to make comparisons between institutions and methods of treatment. Eden has tried to classify the grades of severity of eclampsia in order to reach some common ground. It is a good effort. The question of what should be called puerperal morbidity has never been settled. Some hospitals use the British standard, some the one adopted at Strassbourg, others make their own standards. It will be hard to devise one that is workable and applicable all over. The elevation of temperature is the best guide but is not entirely reliable, e.g., the Editor had a patient who had a temperature of 99.6 F. at several times postpartum; she had a bacteriuria (Staph. and B. Coli) and Osler nodes,—yet she would not have been called "morbid" in any existing classification. Another had a marked phlebitis and her temperature never exceeded 99.4 F. On the fourth floor at the Chicago Lying-in Hospital we had a run of temperatures from 99.4 F. to 100.4 F., but the dozens of patients were perfectly well. We tested the thermometers on this floor and they all registered .8° to 1.2° F.

too high! These false readings invalidated the statistics. Nurses record the pulse sometimes as the temperature. Statistics from those hospitals where rectal temperatures are taken cannot be compared with those where axillary or mouth readings are made. In some institutions the personnel is ignorant and, fearing censure for having too many fever cases, will record only the lowest readings. Hot tea, poor thermometers (those that do not shake down readily), holding the thermometer just behind the teeth (not deep and back under the tongue), too short exposure—all these irregularities render the statistics unreliable and incomparable. Accurate observation and full histories are necessary first of all, then some generally accepted method of tabulation of the results should be devised.]

Gynecology

"Our Obstetric and Gynecologic Responsibilities" was the subject of G. G. Ward's Chairman's Address.[1] Concerning the latter he observed the gynecology of today has undergone a great expansive change from that of yesterday, largely confined to operative technic. This broader development is largely the result of the application of the fundamental principles of physics and chemistry in the study of life processes, and through biology, biochemistry and genetics, a better appreciation has been brought about of the intimate relations existing between the reproductive organs and the body as a whole. There is apt to be overspecialization in all specialties, with a tendency to ignore the outside relations to the problem in hand. The general surgeon and the internist are also frequently at fault in slurring over the gynecologic condition of patients, although the ovarian function may enter as an important factor. While we preach that the gynecologist should look afield generally, we must also urge the general surgeon and internist to look locally.

[Ward considers obstetrics and gynecology one specialty, and calls attention to our responsibility to teach better obstetrics, have more time assigned for the specialty in the curriculum, and more beds for practical instruction.]

As the study of medicine has now become a study of biologic science, our hope for future progress must lie in part in that direction. Our present knowledge of the cellular metabolism in the blood and the vessels, in the nerve centers and cells, and in the endocrine glands during menstruation, ovulation, conception and pregnancy, is very superficial. The physiologic chemist and the biologist must work hand in hand with the clinician

(1) Jour. Amer. Med. Ass'n., July 3, 1926.

in both operating room and laboratory to this end. It is essential we first know the normal processes of Nature to be able to cope with abnormal changes. A better knowledge of the physiology of the reproductive system, of which we know very little at present, must be our immediate goal.

Our progress, however, does not rest entirely on biochemical research. A tremendous improvement is easily possible and within our immediate reach, when we learn to apply the principles of organization and a common-sense audit to our work. Organization implies system, and system is essential if we are to attain uniform accuracy in diagnosis. Science is essentially a matter of observation, and our observations, whether clinical or in the laboratory, must of necessity be precisely recorded if they are to be of value for comparative study and deductive reasoning. The day of "snap opinions" as to our end-results not backed up by recorded facts is slowly giving way to carefully-analyzed observations. Many of our ideas as to postoperative morbidity are founded on tradition. These will be materially changed in many instances after careful statistical study. Organization means a more accurate diagnosis, and a correct diagnosis is essential for a cure and will often prevent unnecessary surgery. This takes time. The careful history, complete physical examination, laboratory check-up, coupled with whatever advice with consultants is indicated—*i. e.*, careful preoperative study and preparation—is, after all, the least that we can do to safeguard the interests of those who place their lives and well being in our hands.

[The principles laid down in this paper deserve emphasis. The gynecologist must be a trained physician familiar with the physiological, biochemical and pathological processes going on in the body incident to the disease under consideration, and their effect upon the local lesion as well as the effect of the local lesion upon them; and further observation proves it is only by the

study and audit of end-results that correct appreciation may be attained. Surgical audit will expose one's shortcomings and erase one's vanity.—Ed.]

The Problems of Organ Conservation in Pelvic Surgery are considered by W. P. Graves[2]: In his study of woman as an individual he has reached the following conclusions as a practical aid in deciding certain of the problems—

1. Before the age of maturity every effort should be made to preserve the full function of the pelvic organs because of their influence on general development.

2. After maturity, preservation of reproductive ability is the prime consideration. If this is not possible every effort should be made to maintain the *full* menstrual function. After 35, these requirements become progressively less stringent.

3. If, for the welfare of patient, reproductive ability and full menstrual capacity must both be sacrificed, complete ablation is preferable to resections and transplantations that result in the scanty semblance of menstruation.

4. The surgeon should be cognizant of the patient's personal and domestic reactions to the question of conserving her organs, and should in all cases be armed with the permission to do during the operation what in his judgment is best for the patient's future welfare.

[We are in accord with Graves' conclusions as stated in 1, 2, 3 and 4.—Ed.]

5. If after full maturity, ablation is necessary, the patient is not unsexed in the popular sense, since sex is a universal and not simply a local physical attribute; nor are the other organs of internal secretion, excepting in unusual instances, permanently disturbed.

[Other organs take up the load.—Ed.]

Conservation of Cervical Stump. The next topic is the question of removing the undiseased cervix during a routine hysterectomy as a prophylactic

(2) Amer. Jour. Obstet. and Gynecol., August, 1926.

against a possible future cancer. Polak in the two papers which he has written on the subject, calls attention to the comparative frequency of the coexistence of myomas and cervical cancer, shown in a series of 900 total hysterectomies to be 2%. On account of this menace of malignant development in the retained stump, he advocates total hysterectomy as the choice in all cases of fibroids where removal of the uterus is necessary. As to the advantages claimed for the supracervical method, namely, ease and rapidity of execution, better anatomic results, and a lower percentage of morbidity and mortality, Polak points out that they have been considerably exaggerated and do not compensate for the danger of a later cancer. In his own series he finds his mortality percentage is only 0.5% greater after total- than after subtotal hysterectomy. Polak's articles like all his published observations carry conviction, based as they are on incontestable facts and extensive experience. The controversy, if there be one, is founded not on principle but on expediency.

[Cervical cancer is an actuality. The diseased cervix must have attention.—Ed.]

In Graves' own work he has been a warm advocate of the supracervical technic chiefly on account of its ease and rapidity, and because it does not expose the abdominal cavity to possible contamination from the vagina and cervix. In carrying out this policy, however, he has had conscientious regard for the cervix. When a lacerated, inflamed, or eroded cervix is present, he has considered a cervical repair combined with a subtotal hysterectomy as better safeguarding the interests of the patient than complete extirpation. In cases of doubt, frozen sections from the cervical tissue are examined before the abdominal operation is undertaken.

After reviewing his 1399 supravaginal hysterectomies Graves finds the mortality percentage for fibroids is low. If total hysterectomy has been carried out as a routine, the number of deaths would have considerably exceeded

the incidence of cancer in the stump. The mortality percentage in supracervical hysterectomies for all causes, though much higher than that for fibroids, is, nevertheless, satisfactorily low, considering the desperateness of many of the cases. In the more difficult cases a total hysterectomy would often have subjected patient to a risk greater than that of a later cancer in the stump. If total hysterectomy is to be employed as a routine for fibroids, consistency demands that it be used in all cases requiring hysterectomy, especially in pelvic inflammatory disease. A patient who dies from an operation is irrevocably dead. One who survives the operation but develops a later cancer of the stump has a definite though small chance of being cured of the cancer.

[We agree that supracervical hysterectomy is both an easier and safer operation than complete extirpation. —Ed.]

Polak's work sounds a note of warning to those who are not ready to give up the subtotal operation. When the cervix is in doubt total hysterectomy is the choice. Subtotal hysterectomy should never be undertaken unless the cervix has been subjected to careful examination and necessary treatment.

J. O. Polak, opening the discussion, stated that on the question of supracervical total hysterectomy, he has modified his views. He has been doing total hysterectomies for a number of years and has perfected a technic which is very satisfactory, but is free to say that supracervical hysterectomies are very much more easily and quickly performed and patients make a smoother convalescence, although the mortality is very little different in the two types. He now does complete hysterectomies only where there is extensive disease of the cervix, complicating the pathology of the uterus for which the operation is done. He is forced to conclude his mortalities and morbidities are slightly lower than when he was so enthusiastic about panhysterectomies.

"That cervical cancer is a definite entity and does occur in the retained stump, Dr. Graves admits, but I am now taking care of the cervix prior to operation, with the cautery and tracheloplasty, depending on the microscope for subsequent treatment. With radium we have a method of treatment for these cervices that are left. In suspicious cases we can absolutely eliminate the occurrence of cancer by using radium in the stump.

"The question of conservation of the uterus and of the ovaries in various types of pelvic disease is indeed controvertible, and in this I disagree with Dr. Graves, as I find that the woman's psychic life is taken up with two thoughts: Will I menstruate? and if I do not, why not? In other words she is spending her life in expectancy and disappointment and that is what unstabilizes our women. I feel that if we are going to do conservative pelvic surgery we should try to preserve the menstrual function. This is indeed most necessary in young women, where an ovary can be conserved. On the other hand, if the ovaries have to be removed then I believe that it is better to remove everything. In the conservation of ovaries, etc., in young women, affected by extensive inflammatory disease, where conservative surgery is practiced, further operative procedure may have to be undertaken."

"Modern Evolution of Gynecology." E. M. Blair[3] can well remember less than ten years ago when first-class gynecologists in America considered their department almost entirely a surgical specialty. He has heard more than once slighting remarks by eminent men about Kelly's "Medical Gynecology." Medical gynecology—"there warn't no sich animile!" Half-way measures were of no avail in the pelvis. Office gynecology was a thing of the past. Local applications were purely a source of office revenue, of no value and so scorned by the conscientious practitioner. "We must earn our living in the hospital, not the office. Away then, with local treat-

(3) Canadian Med. Ass'n. Jour., September, 1926.

ments, many douches, pessaries, vaccine inoculations and what nots." Leave petty treatments for petty ills. Did you ask for advice concerning chronic infection of the cervix or tubes, backache in the presence of a retroversion, moderate prolapse, the answer was always "Operate, and no halfway measures."

[A better understanding of tissue reaction to infection has, and will, save many women from mutilating operations. The best surgeon is the man with judgment based on a knowledge of physiologic pathology, not the technician.—Ed.]

It is not meant to imply that thorough care was not taken in the choice of treatment. There was. Blair was always impressed with the care with which patients in a great New York hospital were chosen during his residency there. It was with pride they pointed to the fact that only two in every seven patients admitted came to operation. This is readily explained in the fact that acute infections, abortions of any sort, and malpositions readily rectified were not surgical cases. The point though is, that the treatment for chronic pelvic infections and persistent malposition was surgery or nothing. But moderation is the very keynote of existence. Therefore it is evolution that brought the moderationist to the fore in gynecology. For after all the foreword in medicine must ever be *help* not *eradicate.*

One of the most remarkable changes has been in the use of the intrauterine curet in incomplete abortion. Perhaps no instrument of modern times has fallen into such disrepute. Yet ten years ago and less it was the usual treatment for abortion, either clean or septic, and even routine in some first-class teaching institutions. The man who did more than any other one individual to preach the evils of curettage was Polak of Brooklyn. Blair once heard Polak say to a body of students, holding a curet in his hand, "Gentlemen, here is an instrument which has undoubtedly caused more deaths than all

the hangmen's ropes, guillotines and electric chairs since the beginning of time.'' Probably he could have included typhoid and the War and been still conservative. To study the protective histology of the pregnant uterus as first presented by Polak, is to become imbued with a thorough respect for the pregnant uterus. To Blair's mind the curet is today relegated to a diagnostic aid in suspected cancer of corpus.

How long is it since the proper treatment for chronic endocervicitis was amputation without fail? Back in the old days? No, only four or five years ago! One remembers the feeling among good men at that time that trachelorrhaphy was an old-fashioned, and halfway method; that might improve the appearance of the cervix, perhaps improve the musculature, but failed in the removal of diseased tissue. Amputation alone succeeded where all else failed. What countless sterilities, backache and leucorrheas this procedure cured. Very true, it did, but what of the cost? Relative sterility due to endocervicitis is truly unfortunate, but fertility following an amputation of the cervix, whatever be the mode of amputation, is also a serious situation in many cases. The argument is not to compare sterility with amputation, but rather to show that the modern trend is to treat the diseased tissue along conservative lines first, and leave the radical procedure to a last resort.

One feels that cervical amputation will soon be relegated to the same category as the curet, *i. e.,* for diagnostic purposes and in those cases of chronic infection with hypertrophy, erosion, eversion and discharge, at the menopause or after. But remember the date—at the menopause or after. It may be that this amputation which has had such a remarkable vogue will soon be considered a half-way measure. One would never remove but part of a tube for the cure of tubal infection, or part of both tubes even at- or near the menopause. The same reasoning should apply to uterus.

[Except in extensive trauma infection, excessive hypertrophy, and wide cystic degeneration, local treatment by puncture, aspiration, cautery and the boroglyceride tampon should replace amputation and excision during the childbearing period. Amputation at the menopause will reduce the incidence of cervical cancer. —Ed.]

Blair questions very much if retroversion in itself ever caused many symptoms. He feels sure that a mobile retroversion never did. Backache, that commonest symptom, comes from many causes, but mobile, uncomplicated retroversion is not one, and for those uteri retroverted and adherent, much can be done before operation becomes the final solution. If such cases be given a thorough course of hot vaginal douches for six days twice a day with monkey walk fifteen minutes immediately following and when at rest lying on the stomach; then, on again presenting herself, one can with time and pains replace the uterus in good position in the great majority. Adhesions holding the retroverted uterus against the sacrum are not as common as is generally thought. Probably most men have struggled conscientiously with an apparently adherent uterus and on operation been chagrined at the ease with which the uterus came up into position. There were no adhesions, but a rounded, moist ball had been held in a rounded, moist, yielding cul-de-sac by suction only.

[Likewise, movable and repositable retroversions do not need surgery except for the psychic effect.—Ed.]

Recent literature continually shows the trend toward conservatism in fibroids. The use of *x*-ray and radium has unquestionably come to stay, thereby greatly reducing the number of operations for this common trouble. And so we might go on down the long line of gynecologic diseases. Everywhere men are conserving whenever possible, and so are gynecologists coming finally into their own true field. For the duty of the gynecologist fundamentally is to conserve the reproductive function

in his community rather than to remove uteri and tubes in large numbers. A gynecologic specialist is not a man who can remove a uterus with especially brilliant technic and *eclat;* many general surgeons can do it just as well. *The gynecologic specialist is he who can tell the general surgeon when not to remove that uterus.*

[All fibroids need watching but relatively few need radical removal. Myomectomy has not had sufficient consideration.—Ed.]

Prophylactic Transfusion. G. G. Ward[4] wishes to call attention to the great value of blood transfusion as a preparatory measure in patients who are to undergo any severe or prolonged operation, where shock or considerable loss of blood may be anticipated, and those who are to have minor operations involving blood loss and who have a lowered resistance, due to anemia, etc.

Gynecologic patients more than any others are most likely to have an associated secondary anemia of varying degree, due, of course, to the menorrhagias or metrorrhagias so frequently present in uterine or adnexal disease. Thus in the N. Y. Woman's Hospital they perhaps see a larger proportion with anemia who have to undergo operation than is usual. The cases with fibroids, carcinoma, idiopathic bleeding, are all most likely to have an associated secondary anemia of varying degree. Many such cases are dangerous risks, yet until recently it has been customary to operate upon such patients, often with Hb. of 50% or less, and a marked loss of erythrocytes, with an inevitable higher mortality rate than is necessary, although a blood transfusion may be done after the operation as a last resort when the grave condition is realized. Indeed, Ward is under the impression that such is the usual practice in many hospitals. He would emphasize the following:

1. That blood transfusion should be employed as a *routine* prophylactic measure before operation much

(4) Illinois Med. Jour., February, 1926.

more frequently than is the practice, especially in gynecologic cases.

2. Every intern on graduation from a hospital should be competent to make the necessary blood typing and matching technic, and to perform a blood transfusion, preferably by direct method. The blood examination is often necessary at night or on holidays when the laboratory force is not available.

3. That 500 c. c. of blood is sufficient in a large proportion for a prophylactic transfusion, and thus this amount is not sufficient to cause the donor distress.

4. The amount of blood lost in many gynecologic operations is not always appreciated by the operator and is a factor that should be considered where patients have a lowered blood state.

5. While post-transfusion reactions occur in about 25% they are usually not serious provided that the donor's and recipient's blood have been directly matched, and that they do not appear to mitigate the benefits of transfusion.

6. If this procedure is more generally adopted, it will result in an appreciable improvement in our mortality and morbidity.

[We concur, this is just in line with the trend for better preparation of patients. Fortunately the patients who come in at night and are operated on the next morning are becoming fewer. It is the right of the woman with acute, subacute or chronic lesion to have all that can be done for her safety. Mortality, morbidity and time of convalescence may be reduced by transfusion.—Ed.]

Need for Urologic Department in Gynecologic Clinics. According to Halsted and Wilens,[5] such a department was started in the Vanderbilt Clinic (N. Y.) July 1, 1921, from then to July 1, 1924, of the 5000 gynecologic patients, 162 were referred for diagnosis, treatment, or both. Findings:—

(5) Amer. Jour. Obstet. and Gynecol., May, 1926.

ORGANISM	CASES	PER CENT
Bacillus coli	79	36.3
Staphylococcus aureus	68	31.3
Streptococcus	35	16.1
Diphtheroid bacillus	3	1.3
Bacillus lactis aerogenes	2	0.9
Bacillus tuberculosis	1	0.4
Sterile	28	12.9

Results—

Cases referred for operation upon the urinary tract	5
Cases discharged as cured	45
Cases improved	97
Cases unimproved	18
Cases lost track of or referred to other departments	7

They decide a vast majority of the urinary disturbances in women are caused by infections of the urinary tract, most commonly by colon bacillus. In many the urinary symptoms are directly dependent upon, or greatly aggravated by, some definite gynecologic condition. This study showed that 3.25% of all applicants to a gynecologic clinic needed urologic examination. Some 75% of cases were apparently benefited by treatment. (This is also shown by the fact that these patients, with hardly an exception, were very faithful in their coöperation and very grateful.) All gynecologic operative procedures should be postponed until any coincident infections of urologic tract have been cleared up. In the future they aim to pay more attention to focal infections as a possible causative factor in these cases. Findings seem to demonstrate the necessity of a urologic department in a gynecologic clinic.

[In line with more accurate diagnosis, reduction of morbidity and mortality. Focal infection in the urinary tract may have as great a bearing as focal infection at other points.—Ed.]

Backache. Concerning "Symptoms Without Signs," Prof. C. Oldfield[6] among other topics took up backache: His criticism of papers by gynecologists is that while they mostly mention it is not attended by any demon-

(6) Edinburgh Med. Jour., July, 1926.

strable organic lesion, as a rule, they do not emphasize this, but rather obscure the fact by detailing a host of gynecologic and other lesions which may cause it. He has long been of the opinion that ordinary backache is, as often as not, unaccompanied by organic disease, and in the presence of organic disease very often is not due to this. In 1200 consecutive examinations there were 67% who had backache, and of these only 34% had an organic lesion.

With regard to the relation of the backward position of uterus and backache his statistics show only a slightly increased incidence of backache in retroflexion over cases in which the uterus is not retroflexed (74%:68%), so that they confirm the opinion he has held for many years that retroflexion, though often associated with backache, is not a cause. Dougal's statistics show an incidence of backache in 26% only in his total of 1000 examinations and of 40% in those cases with pelvic lesions. The probable explanation of the marked difference is while Dougal's cases *complained* of backache, Oldfield's included not only those who complained, but those who on inquiry said they suffered from it. Rather more than half of Dougal's pelvic disease-cases who complained of backache before operation were free after operation and a considerable percentage were relieved. He concludes that pelvic disease is the commonest cause of backache, but does not report how many patients who did not have backache before operation suffered from it afterwards. Oldfield imagines that if Dougal had investigated all his operation cases he would have found that backache was not uncommonly initiated by operations and the incidence after operation was not much less.

Cervicitis with, or without laceration and endometritis, so-called, are thought to be causes, but Oldfield has not noticed any particular liability of these conditions to be associated with backache. Seeing these lesions and backache are both very common, it is inevitable that they will frequently occur together, but it does not follow that the

uterine condition is the cause. From past experience he concludes that backache is usually functional and that such conditions as rheumatism, strain, fatigue of pelvic floor, vague lesions of voluntary and sympathetic nerves of the back, as suggested, are probably very uncommon, if not negligible factors. The practical outcome is while we should search for organic disease in backache, we should not be surprised if any such is not revealed, that we cannot promise a cure of backache after an operation for pelvic disease or insertion of a pessary, nor need we be puzzled by the onset of backache after operation.

[This paper calls attention to a well-known fact, *i.e.*, that the large proportion of backaches are not due to pelvic lesions. We cannot agree, however, with the fact that the correction of an existing lesion will not cure. In many cases the careful follow-up is the answer.—Ed.]

10 Pelvic Sympathectomies were carried out at Villard's Clinic (Lyons) and are commented on by L. Michon[7]: The indications were—Dysmenorrhea, 5; pelvic neuralgia, 2; pain from "congestion" of uterus, pain after phlegmon of broad ligament, and ovarian insufficiency, 1 each. On 6 occasions bilateral sympathectomy of hypogastric was done; unilateral division of presacral nerve, unilateral section of sacral communicating branches, sympathectomy of utero-ovarian pedicle, 1 each. In 2 instances sympathectomy alone was performed. In the rest additional procedures to-wit: Ligamentopexy, 4; dilation and curettage, 2; appendectomy, resection of varicocele, bilateral salpingostomy, ablation of adnexa, of tubal adenomyoma, 1 each.

As a result of this experience, Michon observes that some operations are too recent to judge; however, the first 4 are of sufficient standing and have been traced. The technic on hypogastric is simple, also that on presacral nerve. On the other hand that on the utero-

(7) Lyon-Chirurg., July-August, 1926.

ovarian pedicle seems practically impossible. He proposes further use of division of the sacral communicating branches via the transperitoneal route. He corroborates the experience of others that sympathectomy to a certain extent, favors micturition and the re-establishment of the fecal current after operation. Rather often, there were several spontaneous passages of urine on first day, and flatus was evacuated without pain. It does not seem possible to determine what effect this operation has on the uterine circulation, but there is no doubt pain is favorably influenced. As a rule, the menstrual flow is more profuse postoperative, and keeps up longer. Hence the sympathetic appears to possess a regulating rôle on the uterine circulation. (Michon promises to investigate this aspect as well in the near future.)

[The inhibitory spasm which the sympathetic seems to control, and by its excitation develops hypertrophy, is relieved by sympathectomy. The points of inhibition-spasm are at the pylorus, cecal joint and at the junction of sigmoid and rectum.—Ed.]

Results of 962 Operations on Uterus and Adnexa. These are set forth by Pool and Hawks[8] from 10 years' experience in the 2d Surgical Division (N. Y. Hospital). They are divided into those *(A)* on Uterus, 425—fibromyoma, 221; cancer, 45; retroversion, 159, *(B)* on Adnexa, 537—chronic salpingitis, 226; acute, 66; tuberculous, 19; ectopics, 93; ovarian tumors and cysts, 133.

(A) The 221 interventions for fibroma comprised—171 hysterectomies, 25 myomectomies, 25 minor operations (curettage, etc.), with 10 deaths. [Death rate too high.—Ed.] In cancer there were 13 ablations of cervical cancer with a death, and 4 of fundus with 4 deaths. The rest consisted of cauterization, radium, etc. The authors are of opinion radium gives better results than operation, except for cases seen at very beginning (which is rare). In 118 of the 159 operations done for retroversion, the round ligaments were operated on.

(8) Surg., Gynecol. and Obstet., December, 1925.

[Both radium and operation have a place. It is the selection of cases.—Ed.]

(B) The 225 operations for chronic salpingitis com- 52 unilateral, 28 conservative operations with 5 deaths. In the 87 cases of acute salpingitis there were 63 laparotomies, with a death; 19 cases of tuberculous peritonitis were operated on with a death, 11 good and 6 poor results. The 230 tumors and cysts were 5 parovarian, 65 cystic ovaries, 13 pseudomucous adenomas, 13 serous, 8 complicated cysts; 9 cancers, and 9 teratoid growths.

[I didn't suppose acute salpingitis was an operative condition.—Ed.]

Anatomy and Physiology

Method of Demonstrating the Ganglia of the Cervix, A. A. Gemmell[9], describing this, said the nerve supply of the uterus was receiving renewed attention, but the function of this nerve supply had been more fully recorded than its anatomy, and nothing had been written about the pathologic changes in gynecologic diseases. He added that most observers agreed now that the uterus was supplied mainly by the sympathetic proper (the white rami from the lower dorsal and first and second lumbar nerves) *via* the inferior mesenteric ganglion and hypogastric plexus to the ganglia of the cervix and thence to the uterus itself. All authors agreed there were cervical ganglia, some postulated others in addition. They gave only scanty information as to the site of the cervical ganglia, but placed them at about the internal os. Gemmell had examined the specimens removed by Wertheim's hysterectomy in carcinoma of cervix. No definite attempt had been made to determine the presence or absence of intramural ganglia, but in none of the sections examined were any seen. Dissection of the

(9) British Med. Jour., Jan. 23, 1926.

ganglia, even with the aid of dissecting binoculars, was found to be impossible. A block of tissue was cut, centered on the uterine artery, out of the parametrium and including a piece of uterine wall, and the whole of this examined by serial sections. More recently such blocks had been divided into four and the postero-inferior portions cut serially. The ganglia were always found by this method if they were present, and it appeared that they lay internal to the ureter, posterior to the uterine artery, and at a little distance from the uterine wall. Similar sections were obtained from six patients who died from various other diseases not involving the genital organs; in all cases ganglia were found. The ages ranged from 7 months to 65 years. It would appear, therefore, that these ganglia were present at all ages as normal structures, and were not appearances produced in the nerves by carcinoma or other pelvic disease.

In the discussion F. Shaw asked whether Dr. Gemmell had examined the parametrium behind uterus. He had been very much struck by the excessive shock shown by patients when he had enucleated tumors or growths from this region, and had often thought this part must be especially well supplied from the sympathetic system. Leith Murray remarked that an extension of malignancy from the cervix had been observed in these ganglia and along the related nerves; Gemmell's research might have an importance from that point of view.

Gemmell, replying, thought there were some variations in the positions of these ganglia, as in some specimens he had been unable to find them anywhere in the parametrium. There was the possibility that interference with the ganglia might account for the shock following Wertheim's operation. The utero-sacral ligaments and posterior portion of the parametrium had not been examined, since it was thought there was more chance of finding sympathetic elements along the vessels in this neighborhood as in other parts of the body.

[It has been known that ganglia exist in the cellular structures about the cervix. Their clinical significance deserves further study.—Ed.]

Blood Pressure. A series of 1230 subjects were investigated by Alvarez and Zimmermann[1] regarding

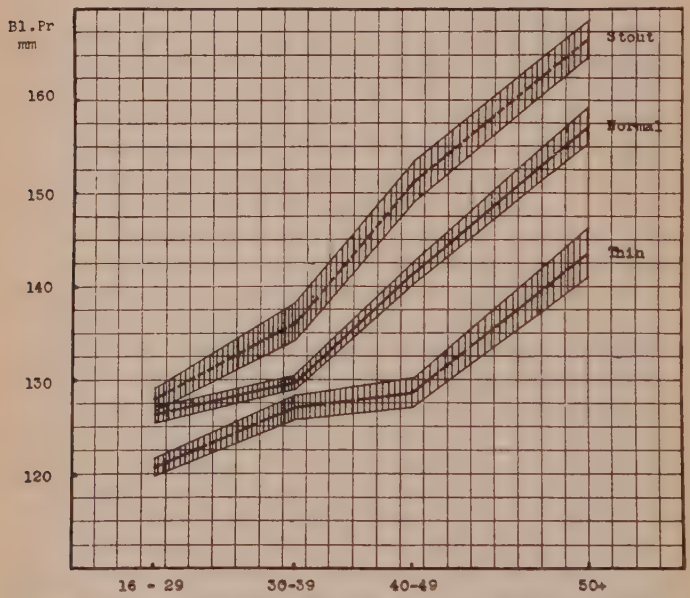


Fig. 7. Mean systolic blood pressure in women with different builds and ages; the shaded area represents the ± probable error of the mean. (Alvarez-Zimmermann.)

blood pressure as influenced by the sexual organs: The average pressure for all ages in women who seem to be sexually normal is 134.5 ± 0.7 mm. of mercury. Corrected for weight it is 133.8 ± 0.7 mm. The average in the twenties is 122.1 ± 0.7; in the thirties 125.8 ± 0.7; in the forties 135.3 ± 1.2, and after 50 it is 154.4 ± 1.7 mm. The mean diastolic pressure for the corresponding age groups is 82 ± 0.8, 83.5 ± 0.6, 88.4 ± 0.9 and

(1) Arch. Int. Med., May, 1926.

93.8 ± 0.9. Well-proportioned women have systolic pressures that average 10 mm. higher than those of the thin, and pressures in the stout average 12 mm. higher than in the well-proportioned. (An allowance has to be made for these differences when any two groups of women are being studied. The sexually-abnormal have pressures that average considerably higher than do the sexually normal. As the sexually-abnormal tend to get married a little late as compared with their normal sisters, we find that single women have pressures averaging a little higher than those of the married. A masculine distribution of body hair, sexual anesthesia, fibroids, thyroid disease, and pelvic conditions requiring ovariectomy or hysterectomy are associated with high average pressures.

[Resulting from an unbalanced endocrine system.—Ed.]

Abnormal menstruation, early menopause and pregnancy have no demonstrable effect. Marked hypertension was found in a few girls who seemed to be normal sexually, but in these cases it was not of the primary type but was associated with severe nephritis. The evidence here presented supports the theory that the "essential" type of hypertension is a bodily peculiarity, inherited equally by girls and boys, but ordinarily repressed in women before the menopause by the ovarian or other related secretions. When the pelvic organs are subnormal, the disease may appear in women as early as it does in men.

[This study confirms former knowledge.—Ed.]

Sex Hormone in Circulating and Menstrual Blood. In the 1925 volume (p. 324), R. T. Frank and associates gave an account of the occurrence in animals. In a recent article, with Goldberger[2], he furnishes a preliminary report on occurrence in humans: They found the amount of sex hormone found in the circulating blood of the human varies during the menstrual cycle. An

(2) Jour. Amer. Med. Ass'n., May 29, 1926.

abrupt increase takes place beginning between the tenth to the fifteenth day counted from the first day of the last menstruation. The sex hormone is present in greatest concentration in the circulating blood near the first day of menstruation. With the onset of menstruation, the sex hormone abruptly diminishes in the circulation. The sex hormone appears in the menstrual blood, there being present in from triple- to sixfold the concentration in the circulating blood. In certain types of menorrhagia and metrorrhagia, the sex hormone may be *(a)* absent from both circulating and uterine blood; *(b)* in others, present in both circulating and uterine blood. In certain amenorrheas, an increase in amount of the sex hormone may be demonstrated in the circulating blood.

From these observations they feel justified in concluding that: *(a)* The female sex hormone secreted by the maturing follicle reaches the general circulation. *(b)* The sudden increase of sex hormone found 10 to 15 days after the last menstruation may be used approximately to determine the time of ovulation. *(c)* The sex hormone secreted by the corpus luteum likewise reaches the general circulation, continuing the pregravid stimulation of the genital tract and breasts as demonstrated by other methods in a previous communication. (1925 volume, p. 324.) *(d)* During the pregravid stage, either (1) a concentration and storage of the sex hormone takes place in uterine tissues, or (2) the uterine mucosa at the time of the menses filters out the sex hormone from circulating blood. *(e)* Two types of menorrhagia or metrorrhagia occur, the one with oversecretion, the other with undersecretion of the sex hormone. Further study may enable us to elaborate proper forms of treatment based on the etiology. *(f)* Some amenorrheas may be due to persistence of the corpus luteum, as evidenced by a persistence and undue concentration of the sex hormone in circulating blood. (These studies are being continued and elaborated with every prospect of affording valuable aid in both diagnosis and therapy.)

[A most interesting study, having great possibilities in the study of menstrual disturbance.—Ed.]

Female Sex-Hormone. In their latest communication, Frank and Goldberger[3] announce a new method of determining sex with malformation. In two instances they have definitely established the sex by demonstrating the presence of the female sex hormone in the circulating blood by injecting lipoid extract of the blood into castrated mice and thereby producing a positive (estrual) vaginal spread. The theoretical considerations involved are that a person possessing functioning ovaries, irrespective of whether the tubular tract (vagina, uterus, tubes) and external genitals are malformed or aplastic, should have a demonstrable quantity of sex hormone in the circulating blood some time between the fifth and fifteenth days after ovulation. Therefore, blood specimens should be taken at weekly intervals in order not to miss the acme of reaction. Negative results cannot be considered of definite significance, as ovaries might be present but might not be functioning over longer or shorter periods of time. Positive findings, on the other hand, must be evaluated as decisive, and even in the most extreme case, that of an ovotestis in which cyclic ovulation takes place, such a person should be considered as predominantly feminine. This method should prove a boon wherever the question of establishing the sex arises and a positive feminine reaction can be obtained. (It is naturally not applicable before puberty.)

Diagnosis

The Sedimentation Test in Gynecology. This has attracted considerable attention of late, and the first paper to be noticed is that by Baer and Reis[4]: They made 192 tests on 100 patients, and found it useful in

(3) Jour. Amer. Med. Assn., Aug. 21, 1926.
(4) Amer. Jour. Obstet. and Gynecol., September, 1925.

determining the presence or absence of infection. With pelvic pathology, a negative test, *i. e.,* a sedimentation time over two hours, conclusively rules out infection. The rate of sedimentation is directly proportional to the virulence of infection. The test is a further aid for

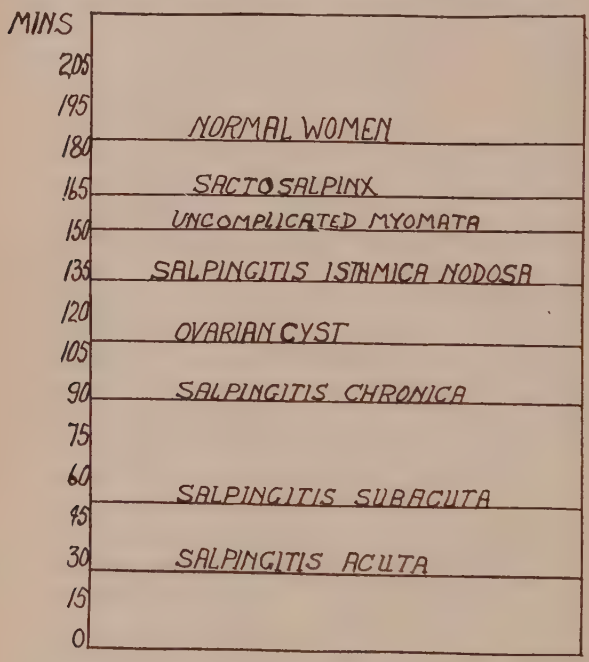


Fig. 8. Average rate of sedimentation in certain gynecologic cases (Baer-Reis).

determining the safe time for operation. It seems a more delicate prognostic index, good or bad, than either the leucocyte or temperature curve.

[Our work confirms these studies.—Ed.]

Experience at the Harlem Hospital (N. Y.) is related by T. H. Cherry[5]: There 40% of the gynecologic patients have some form of adnexal disease, they depend consid-

(5) Ibid., January, 1926.

erably on leucocyte count and temperature as an indication of the degree when count is under 16,000 as a mild infection, or active when above 16,000. They operate upon first group, if T. becomes normal and remains so 3 to 5 days, provided the clinical findings justify it. In second group, prefer to await the subsidence of T. and a definite lowering of the count to 16,000 or less, before intervention; however, in certain progressive inflammatory conditions, operation is performed with leucocytes still high.

In a series of 628 patients who had sections for adnexal disease, 508 had counts of 16,000 or less. Among this group there was a mortality of 4.1 and an average morbidity of 17.8 days. There were 120 patients whose counts were above 16,000. This group had a mortality of 16.6 and an average morbidity of 1.85 days. These results definitely show the count is dependable in determining, to a certain extent, the degree of infection.

To ascertain whether the sedimentation test was more dependable than the count in pelvic infections and the relative value of each, 71 patients were closely observed both pre- and postoperatively. Twenty-six were operated upon with removal of their pelvic lesions, consisting of tubal and tuboövarian abscesses. The sedimentation time in all was under 30 minutes. The counts averaged 13,250. No deaths occurred and the average morbidity was 18.2 days.

[Mortality and morbidity may be reduced by correlating the sedimentation time, leucocyte count and temperature record.—Ed.]

That the sedimentation time is a simple test, readily performed is unquestionably true. The rate, however, is easily influenced in diseases by absorption into the general circulation of unknown substances that produce a change in the chemical and physical balance of the blood elements. This balance is no doubt readily upset, and especially in all types of infection, thus rendering it a most delicate indication of the invasion of the human

organism by disease. This is manifested by an increase in the speed of settling of the red cells, which responds to infection much more quickly than the increase in leucocytes. The increased rate does not, however, indicate the degree and virulence of the infection as shown in the 71 cases above; neither from the observations made, does a low time signify a bad prognosis. However, a steady lowering of the time means an increasing toxemia that may terminate fatally, yet it would be unwise to base a prognosis upon this one test unless substantiated by other reliable manifestations. As a diagnostic agent alone, it is untrustworthy in pelvic conditions, yet it may aid in influencing an already doubtful position to one that is more tenable. In such infections the count, while not so readily affected or delicately influenced as the sedimentation time, is for this reason a more reliable indicator of the degree and virulence of the infecting organism, and, therefore, more dependable to determine the most suitable time for intervention.

[The sedimentation time is more sensitive than leu cocyte count, and helps in differential diagnosis.—Ed.]

Henry and Herbert Schmitz[6] *subjected 80 patients to the test, and* 245 determinations were made: An acceleration of the sedimentation time was observed in most cases of adnexitis, myomata, and carcinomata. The test is not an aid in the determination of the time of safe operability of adnexitides. The constancy and degree of the acceleration of sedimentation speed in myomata and carcinomata is about the same in both. Therefore, the test should not be used in the differential diagnosis of benign and malignant new growths or of inflammatory swellings and myomata. Blood analysis and temperature records give reliable information about the time of safe operability of inflammatory adnexal diseases.

I. Smiley[7] is of opinion the test *finds its greatest usefulness* in the evaluation of adnexal conditions. The

(6) Amer. Jour. Obstet. and Gynecol., March, 1926.
(7) Med. Jour. and Record, July 7, 1926.

presence of inflammatory processes, their nature and virulence, and the reaction to such infection can be determined with a fair degree of certainty. As an aid in differential diagnosis between adnexal diseases, ectopics and other pelvic masses, the test can be very useful and may serve to render needed help where the question often arises whether or not to operate. While the inadvisability of operating upon acute pelvic infections is not a new thought, many occasions nevertheless arise whereby operation becomes necessary. Their usual custom has been to await such time when T. has been normal for several days. They were even then unable to state definitely that a latent infection did not exist especially in cases that had streptococci or staphylococci as the offending organisms. *The test may help considerably and a rate of 2 hours or over prior to operation will give positive proof that bacteria have disappeared, infection at a standstill, and patient is a safe risk.* [Italics by Editor.]

In cancer of the uterus the rapidity of the sedimentation constitutes a valuable addition to the diagnostic aids, especially for the recognition of doubtful cancers if it be combined in proper fashion with the blood count and a study of the color index. In cancer of the female genitalia there is constantly a deviation from the normal in the rate which, however, does not always correspond to the extent of the cancer, but is dependent upon the injury to body as a whole. After radical operation the rate gradually returns to normal. Where palpation indicates freedom from recurrence after operation it is justifiable to doubt the findings if the rate is greatly decreased and other processes which might be responsible for this change can be definitely excluded. The same holds true where patients have been radiated. Radiation in any form reacts unfavorably upon the test, and a rapid sedimentation is the usual picture following exposure. The rise in the rate is gradual and constant, and any decrease during apparent physical improvement

usually means a recurrence even though not discoverable at the time.

The sedimentation test should not replace careful observation of the T. curve and repeated examination of leucocytes. Both are valuable aids in studying the character of the conditions present. *The test, however, serves the same purpose and is often present before any change is noted in count and gives better and earlier information between resistance on the one hand and virulence on the other.* [Italics by Editor.] It also allows of a better interpretation of the prognosis indicating a favorable or unfavorable outcome by its rise or fall, while the count and T. may remain stationary or show little change.

Of the 1158 patients studied by D. D. Troubitsine[8] 70 were in normal health, 92 pregnant, and the rest with various gynecologic conditions. He decides: (1) The sedimentation rate is not a specific reaction for a definite affection. (2) The causes of rapid sedimentation being found in various gynecologic affections, the rate has no diagnostic importance. (3) The rate may be regarded as a criterion of health and disease and as an indication as to the time for intervention; a slow rate is a guarantee of a healthy condition of the organism, while rapid sedimentation is a sign of a morbid state without indicating its nature. (4) There is no definite relation between the duration of sedimentation on the one hand and the number of leucocytes, red cells, quantity of Hb., duration of coagulation, and amount of chlorids in blood on the other.

Endoscopy of Uterus. H. F. Seymour[9] informs us that he began with a tube angled like a uterine sound, to facilitate introduction. This tube, after introduction, was straightened out by a device which held it fixed in the straight position. The light was at ocular end, reflected into the tube, as in one type of sigmoidoscope.

(8) British Med. Jour., Aug. 7, 1926.
(9) Ibid., Dec. 26, 1925.

With this he obtained some views of the endometrium, but only fleeting ones, as blood oozing out and mucus soon obscured the view. After examination of a few cases, he soon found it was unnecessary to have an angled tube, as a straight one is easily introduced after the cervix has been dilated up to 10 or 12 mm.

The next problem was to get rid of the obscuration of the view by blood and mucus. Constant irrigation by sterile water or saline did not solve the difficulty, as it was found impossible to get rid of air bubbles. Seymour determined to try a hysteroscope made on the bronchoscope principle. There are two tubes made of brass, each 28 cm. long, one having a bore of 6 mm. and the other of 9. The light at distal end, is furnished by

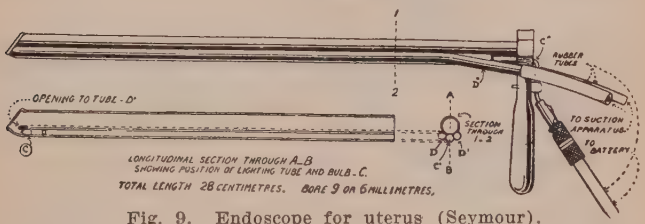

OPENING TO TUBE - D
RUBBER TUBE
TO SUCTION APPARATUS
TO BATTERY
SECTION THROUGH 1-2
LONGITUDINAL SECTION THROUGH A-B SHOWING POSITION OF LIGHTING TUBE AND BULB - C.
TOTAL LENGTH 28 CENTIMETRES. BORE 9 OR 6 MILLIMETRES.

Fig. 9. Endoscope for uterus (Seymour).

a dry battery on the current from the main, after it has been run through a suitable resistance. The distal end, which carries the light close to the opening, is bevelled at 45°, and the edges are rounded off so there is nothing to scratch the endometrium. In the wall of this tube are three channels—one for the rod which carries the light, and one on each side for suction; either channel can be used for irrigation if need be. When in use the suction channels are connected by rubber tubing to a bottle with a rubber cork, which is kept a partial vacuum by an electric suction apparatus. He found the Mennell pump satisfactory; it can be used with any voltage, which is a great convenience. The 9 mm. tube is intended for general use; the smaller (6 mm.) is reserved for the post-climacteric uterus, or for cases where dilatation to over 10 mm. is difficult.

For an endoscopic examination place a glycerin tampon against the cervix for two nights to make it easily dilated. Seymour usually slowly dilates up to 12 mm. The hysteroscope is then very gently introduced; a swab on a sponge holder is used as an obturator, and prevents the lamp becoming obscured by blood during the passage through cervical canal. The suction apparatus should be set going previous to the introduction. When the instrument is passed in almost to fundus, the swab on its holder can be withdrawn, and only introduced

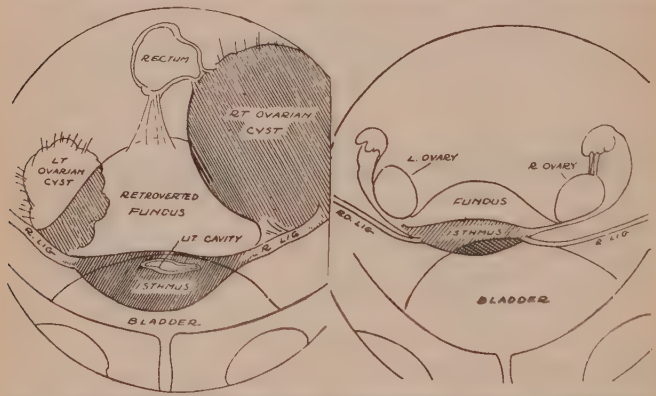


Fig. 10. Bilateral ovarian cysts; retroverted uterus. Adhesions.
Fig. 11. Normal genital status, 13 year-old girl. Question of pregnancy negatived definitely by film evidence (Stein).

again should the lamp become smeared. With the suction apparatus working briskly, the lamp end of tube only requires swabbing out 3 or 4 times during an examination. The whole endometrium is then carefully scrutinized by turning the instrument about and by partially withdrawing and reinserting the lighted end. The whole lining of the uterus cannot be seen at once; it has to be examined piecemeal. There is an aluminum handle which is intended to give one direction during use.

Pneumoperitoneum in Diagnosis is praised by I. F. Stein[1] after 2 years' experience: About a liter of carbon

(1) Surg., Gynecol. and Obstet., January, 1926.

dioxid gas is introduced through Rubin apparatus. In over 150 instances, the only complaint was the "shoulder pain" for a few days, but relieved in recumbent posture. After a provisional diagnosis following usual gynecologic examination, pneumoperitoneum was induced upon the *x*-ray table, the partial knee-chest posture was arranged, and stereoroentgenograms were made. A diagnosis was made independently by the roentgenologist from the *x*-ray evidence alone. After a joint study and discussion of the films, the clinical and *x*-ray evidence was correlated. In the operative cases the diagnosis was finally checked up when the abdomen was open. The interpretation of the films was indeed the most difficult part of the investigation, and they confess to many errors in early diagnoses. With greater experience they are becoming more familiar with the roentgen aspect of pelvic conditions, and are often surprised at how readily they now recognize certain pathologic conditions, and how much oftener they agree. By using the Potter-Bucky diaphragm in addition to the uterus and ovaries, visualized in some cases the normal tubes, round and broad ligaments, bladder and adhesions. The following conditions have been compiled from pneumoperitoneal diagnoses:

Normal genital status	12
Hypoplastic uterus	2
Immature uterus	2
Bicornuate uterus	1
Uterus duplex	1
Displaced uterus	7
Ventrally fixed uterus	2
Early pregnancy	10
Ectopic pregnancy	2
Pseudocyesis	2
Fibroids	8
Ovarian cyst	13
Papillory cystadenoma of ovaries (malignant)	1
Tubo-oöphoritis	5
Chronic salpingitis	6
Frozen pelvis	1
Adhesions	24

[The Editor fails to see how pneumoperitoneum can be induced by peritoneal insufflation in cases of suspected early pregnancy and ectopic; and must add a word of warning against its employment as a routine aid to diagnosis. More care in taking histories, and intelligent interpretation of the signs and symptoms of disease, will usually make a diagnosis in the conditions noted above.]

They failed to obtain diagnostic films in 2 cases because the gas was injected subperitoneally, wholly or partially. These were in unruly subjects.

After his experience, Stein believes *x*-ray after gas inflation of abdomen is of material aid in gynecologic diagnosis. It is not a routine, the usual gynecologic examination sufficing ordinarily. In obese, uncoöperative, ignorant, or mentally deficient women may be the only means of accurate diagnosis before operation. Its value lies not alone in positive evidence but also negatively in allaying suspicion of pregnancy or pelvic lesions with few palpatory findings. As a *matter of record* it has great value. It is a safe method. The uterus, ovaries and tubes, round ligaments, and bladder can be clearly depicted on the film by a careful technic. Pelvic pathology is graphically shown by silhouetting the viscera on the film after surrounding them with gas. Tumors are readily differentiated. Carbon dioxid is preferred to air or oxygen because of more rapid absorption. All 3 are safe. The transuterine route is preferable when the Rubin test proves the tubes permeable. The latter procedure is of distinct value in sterility both diagnostically and therapeutically.

Obtaining Vaginal Secretion Uncontaminated. Harris and Brown[2] to obviate the dangers of contamination inherent in both the speculum and Menge tube, have developed a device which consists of a tube of ordinary 8 mm. laboratory soft glass, 120 mm. long.

Fitting snugly, but permitting free motion within it, is a second glass tube, made of the same material and measuring 220 mm. long. A cylinder made of ordinary thin rubber glove

(2) Amer. Jour. Obstet. and Gynecol., April, 1926.

stock, measuring about 120 mm. long and 7 mm. wide, and open at both ends, is drawn over the lowermost 30 mm. at one end of the outer tube, in such a way that about 45 mm. of it projects beyond the end of glass tube, while the rest of it is rolled on itself so as to form a cuff, which secures a tighter fit, *(a)*. The inner glass tube is then pushed through the free end of outer tube and, when its extremity reaches the lower end of latter, the projecting end of the rubber cylinder is invaginated into the inner glass tube, the rubber being thrown into folds, *(b)*. To prevent slipping, the junction of the outer and inner tubes is wrapped with a wisp of cotton, *(c)*. An ordinary wooden applicator, 300 x 2 mm., covered with a cotton swab at one end, is inserted through the free end of inner tube until it comes to rest upon the infolded end of the rubber cylinder and is fixed at that point by wrapping the junction of the applicator and the inner glass tube with a wisp of cotton *(d)*. It is placed in a large test tube, wrapped in a double cover and sterilized in autoclave. These tubes may be prepared in quantity and used as desired.

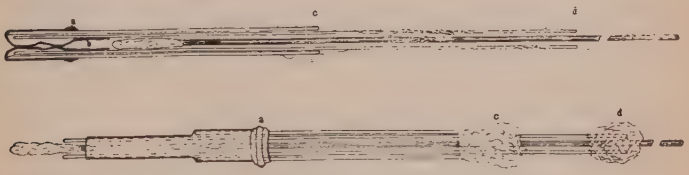


Fig. 12. (*Above*) Device assembled and ready for use.
Fig. 13. (*Below*) Device in vagina after swab has been pushed out (Harris-Brown).

When taking a culture, without preliminary disinfection, the labia are parted as widely as possible. The rubber-covered end of outer tube is gently placed within introitus, care being taken it is not pushed up into vagina. Then, while holding outer tube in place with left hand, pressure is exerted upon the inner tube with the right. As the latter is pushed down, the infolded rubber cylinder gradually emerges and unfolds until finally the free end of the inner tube slips through the rubber covering and comes to lie high up in the vaginal vault. (It should be particularly noted that the rubber cylinder is not pushed up in the vagina, but simply unfolds from the end of the tube, so the end of the inner glass tube is not exposed until it emerges from the end of the rubber cylinder.) The applicator stick is then pushed down until the cotton swab comes into contact with vaginal wall. A few turns of the stick enable the swab to collect enough secretion for bacteriologic study. The stick and swab are then withdrawn while tube is still in place and are placed in a sterile test tube or the appropriate media are directly inoculated.

In using this device the only difficulty encountered is the rubber cylinder may stick as it emerges from inner tube. This, however, can be obviated by dusting the cylinder with talc as device is assembled. The glass, as well as the rubber cylinders, may be used repeatedly. At first they determined the point of emergence of inner tube through the cylinder by a mark on tube, but, with a little practice, this was found unnecessary, as it is evidenced by a slipping sensation transmitted to the fingers. After it has been sterilized a culture can be taken within one or two minutes and requires no preparation of patient or operator. To make sure that no bacteria are carried up from labia the external genitalia of 10 subjects were swabbed with a culture of *B. prodigiosus,* a non-pathogenic organism. Then, without attempting to sterilize the labia, cultures were taken by the device described. After 48 hours' of incubation no red colonies were found, conclusively demonstrating no bacteria had been carried up from labia.

Transillumination of the Cervix is offered by L. R. Thompson[3] primarily as a means of diagnosing the condition of the glands. The cervix may be transilluminated by a light applied to the vaginal surface, or by a small light introduced within the canal. A hooded light must be used for the outer surface of cervix, so all the rays are directed into the tissue. A Carroll antrum transilluminator with light at right angles to a straight handle, serves well. The position of the light and its intensity must be varied until just the proper illumination is secured. A light from a urethroscope may be used for the inside of cervix. The first cervix he examined this way had a definite cyst visible to ordinary examination. Transillumination revealed the cyst as an area more translucent than the rest of cervix, and clearly defined by the light. Incision liberated clear mucus. A normal cervix does not show, when transilluminated, any areas more translucent than the rest. When the glands

(3) Jour. Amer. Med. Ass'n., May 8, 1926.

are moderately dilated, they may be seen as elongated structures arranged radially around the canal, and extending well into the tissue. Transillumination will be found very valuable in determining the source of a discharge from cervix. It will demonstrate endocervicitis in some cases in which sterility is the complaint. It will determine with greater precision the patients needing an operation of the Sturmdorf type. Transillumination is so simple a procedure it should be done as a part of the routine examination.

[A method to reveal presence of deeper cysts, and their location.—Ed.]

Lipiodol in Gynecology. This agent introduced in France a few years ago for use in neurology, has been applied to gynecology as well. MM. Grégoire, Darbois and Béclère[4] describe the use in the uterus and tubes preliminary to *x*-ray: The lipiodol is injected hot to obtain greater fluidity, and more ready penetration. After introduction of 10 to 20 c.c. the normal uterine cavity appears as a triangular image, continuous at its ends by the thin ribbon-like and more or less flexuous contour of the tubes. When latter are patent, the lipiodol falls drop-by-drop into the peritoneum. This method is very instructive in: *(A)* Localizing tumors as either in uterus, outside of it, or even not connected with it or adnexa. *(B)* In metrorrhagia showing the presence and the nature and situation of an intrauterine growth. *(C)* In study of tubal patency.

[Should be added to our diagnostic methods.—Ed.]

Q. U. Newell[5] has made use of *iodipin on 38 occasions* for diagnostic purposes: He finds in sterility cases where the tubes are found obstructed, it is useful to determine the character and location of obstruction. It offers the welcome opportunity to decide definitely whether or not case is suitable for operation. When several masses are palpable within the pelvis. Injection

(4) Gaz. des Hôpitaux, April 21, 1926.
(5) Amer. Jour. Obstet. and Gynecol., August, 1926.

and *x*-ray study will clearly differentiate the uterus from the other masses. Where pelvis is blocked by one large mass. By this method the precise diagnosis can be made whether tumor is originating from ovary or uterus. In cases in which a foreign body is suspected within or outside uterine cavity. Iodipin injections into uterus prove helpful in differentiating chronic appendicitis from a right-sided salpingitis, and a tuberculous-from common salpingitis, which means they possibly might enable us to make a definite diagnosis of a tuberculous tube. It is a valuable aid in indicating the size of the uterus, and in determining whether the cavity is encroached upon by any masses, *e. g.*, a fibromyoma, carcinoma of fundus, etc. Iodipin injections, carefully done, are not likely to do harm. (Plate XIII.)

Diagnosis by *X*-Ray After Injection of Lipiodol. MM. Cotte and Bertrand[6] state that they had very good results by this method in biliary fistulæ, and therefore used it in gynecologic conditions as well. In 30 subjects the patency of tubes was tested. The use of *x*-rays is not new, of course, in gynecologic affections, but seems to have been mostly confined to the uterus. At first the uterus and adnexa were examined by fluoroscope after pneumoperitoneum. This was soon given up, and at present either insufflation is made use of, or radiography after injection of some opaque material. Cotte and Bertrand have never practiced insufflation, deeming it much too indefinite. Employment of some opaque material seems preferable, but instead of resorting to Sodium bromid, argyrol or collargol they chose lipiodol. They began by injecting organs removed at necropsy, and finding it worked well, extended it to the living.

While MM. Mocquot and Grégoire insist on spinal anesthesia to prevent all pain or sudden movement, the authors merely give a hypodermic of morphin as a preliminary. The only pain noted was slight at the time the uterine cavity was distended, or the tubes; or when

(6) Lyon Chirurg., May-June, 1926.

PLATE XIII.

A case in which uterus and tubes are normal. The uterus is displaced to the right of median line by an ovarian cyst about size of an orange, situated to left of the median line. *A*. Speculum. *B*. Uterine cavity. *C*. Excess iodipin—tubes open. *E*. Excess iodipin behind uterus.—Newell, page 363.

PLATE XIV.

Appearance of lipiodol in uterine cavity and both tubes, and beading due to peristalsis in right tube.—Rubin-Bendick, page 366.

the lipiodol penetrated the peritoneum. This pain is useful as showing to some extent the progress of the injection. All exploration is naturally out of question if pregnancy is suspected. None of the patients in the authors' series had any untoward results. However, they believe it should be done only in hospital, where constant supervision is possible.

What is expected from this exploration? The situation of the tubes with regard to the uterus is well shown, and several plates can be taken; if necessary the relation can be emphasized by stereoscopic plates. As to the patency or not of tubes, the condition shown by *x*-ray was always corroborated by operation. From this point of view the anatomic diagnosis of sterility or dysmenorrhea seems to derive most advantages from the method. In the former, we may by its help, see if in addition to anteflexion or hypoplasia, there is not some obliteration of the tubes which had not been detected. Better than insufflation, we can find the relation of the tubes to the uterus, their impermeability if it exists, and the uni-or bilateral site of lesions. If dealing with a patient, who has had salpingitis previously, we can see how recovery has taken place and be assured of the exact situation and permeability of the tube.

So, too, with dysmenorrhea, one of the authors has already pointed out that in many instances of serious dysmenorrhea or rebellious to the usual means, there are uteroadnexal lesions (especially of the tubes and ovaries) too slight to be detected clinically but which explain the failure of therapy. Before doing a laparotomy, often of exploratory nature, the authors believe the lipiodol method should be resorted to. It will always be of interest to examine by this means subjects after salpingostomy or even salpingectomy. In one of their own patients after salpingostomy, the tube was perfectly patent; the same in another following implantation of tube in uterus. Lastly, after some salpingectomies done without infolding of the stump and without excision of

the interstitial portion, it can be seen that sometimes the uterus communicates directly with the peritoneal cavity, explaining the pregnancies after bilateral salpingectomy.

Secondary infection has been met with after insufflation, but Cotte and Bertrand have never observed it after lipiodol injections. Even in subjects with salpingitis the injections caused neither rise of temperature nor any peritoneal reaction. Though this does not prove such is impossible. However, there seems less danger, the marked strength of iodin in lipiodol gives some antiseptic value. In fact the method could be resorted to possibly in the treatment of acute salpingitis.

[An ingenious suggestion, but should not be tried out in acute salpingitis.—Ed.]

Rubin and Bendick[7] describe *fluoroscopic visualization of tubal peristalsis,* by *x*-ray after lipiodol:

For this preliminary study, only patients were chosen in whom insufflation had shown tubes nonpatent or partly blocked. In 26 subjects at office, fluoroscopic observations were made during the lipiodol injection, and for several minutes after the uterine cavity and tubes were filled. Films also at same time, ½ hour later, next day, and at intervals for some weeks to note stay of lipiodol in tubes or peritoneum. In all but two, 5 c.c. filled uterine cavity and tubes to full length. In rest the quantity was doubled.

The results in the first two of the 26 cases were not clear, but they were useful in indicating points in technic to which special attention had to be paid in subsequent cases. The present report is based on data obtained in 24 cases. Of these, 7 were blocked close to the uterine wall. In 17, one or both tubes were visualized. Fifteen showed peristalsis which could actually be watched under the fluoroscope and evidence obtained on the films by the beading which Dyroff described as "pearls."

(7) Jour. Amer. Med. Ass'n., Aug. 28, 1926.

Roentgenologically it is the lumen that is visualized. This can be divided into two portions—the first, a fine, hairlike process extending from the uterine cavity a distance varying from 1 to 3 in. Its course is usually down and out and fairly straight. The second portion is tortuous and more or less dilated, corresponding to the ampulla, which varies in length from 1 to 4 in. The first portion can be seen with careful fluoroscopy; it empties and fills, but no rhythmic action can be seen. It is in the second portion, the one corresponding to the ampulla, that motion can best be studied. Three types of motion are encountered: 1. The passage of lipiodol through the tubes as a result of pressure exerted by the injecting syringe transmitted through the uterine cavity into the tubes. This movement is slow, somewhat irregular, and goes from uterus to fimbria. 2. A wormlike twisting action of tube. This may be due either to a contraction of longitudinal muscle fibers alone or in conjunction with a movement transmitted from adjacent viscera. 3. A true peristalsis, showing as a distinct beading, which travels in a wavelike motion (similar to gastric peristalsis), starting at the fimbria and progressing toward the uterine cavity. It occurred at a rate, varying in different subjects from approximately 5 to 9 a minute. It could not be seen in all and was seldom seen as soon as the tube showed dilatation. Whether this rate is normal or a response to a foreign material (lipiodol) in the tube is impossible to state, but it proves that the tube is capable of a rhythmic regular peristalsis extending toward the uterine cavity. The peristaltic waves were counted by a stop watch with a fluorescent dial and are therefore only approximately exact.

[Observations show direction of current.—Ed.]

Further study may yield data on normal physiologic tubal contractions similar to those obtained by gastrointestinal roentgenography. For this purpose, however, lipiodol injection in the presence of normally patent tubes would be necessary. Forsdike and others who have

used it for diagnostic purposes, state that it is followed by no untoward sequelæ. Rubin and Bendick have seen no complications arise when tubes were completely blocked. The lipiodol has been either removed by aspiration, or the little that remained in the uterine cavity was found to escape almost immediately after the canula was removed. In the tubes the lipiodol may remain a fairly long time if the obstruction at any point is complete or only partial. This is especially true when cystic dilatation of the tubes is present. In a few cases, the lipiodol was seen lodged in the tubes several months after the injection, but no symptoms referable to its presence were noted. In those cases, however, in which the lipiodol has escaped into the peritoneal cavity immediately following the injection into the uterus or sometime afterward, it is possible that peritoneal irritation may result. They recall the experience with intrauterine collargol injection in the presence of patent tubes, in which an appreciable amount of peritoneal irritation was seen, and it is not impossible that under similar conditions the same results may follow lipiodol. In one of 3 patients with partially patent tubes, lower abdominal cramps were complained of at least 12 hours after the injection. There was no febrile reaction, and the patient was able to appear on the following day for a control *x*-ray examination. It would be well, therefore, never to inject lipiodol into uterus without first proving by insufflation that the tubes are definitely nonpatent. (Plate XIV.)

Operative Technic

A New Clamp for Vaginal Hysterectomy introduced by R. G. Hendricks[8] is designed to meet the following requirements: (1) Safety; (2) ease of application; (3) minimum weight and bulk, and (4) ease of removal.

(8) Jour. Amer. Med. Ass'n., July 17, 1926.

Ordinary hemostats are readily applied but have the added danger of letting loose at the clasp and must be tied or secured while in position. From 4 to 6 handles protruding from vagina are heavy, bulky and difficult to loosen and open up without pain. The advantages of the new forceps lie in the principle of the screw, which permits any given amount of pressure to be applied to the jaws, and is proof against slipping loose after it has once been placed in position. The blades are 2 in. long and so angulated as to facilitate application to the broad

Fig. 14. Clamp for vaginal hysterectomy (Hendricks).

ligament. It also leaves this structure in approximately normal position after uterus has been excised. Aside from the element of safety of the screw over any lock device is the ease with which it may be removed. The nurled nuts are easily accessible and may be turned so patient scarcely feels this heretofore-dreaded procedure. A few turns partially open the blades, the forceps fall out, and the operation is completed.

[Clamp has a mechanical advantage in doing vaginal hysterectomy for pelvic infection, for it may be placed well out on the ligaments, and shut off lymphatic extension; it also acts as a drain.—Ed.]

Improved Vulsellum. The instrument made for H. C. Donald[9] does not tear out because it folds in a portion of tissue in the ring and the teeth do not catch

(9) Lancet, Aug. 21, 1926.

when being inserted into cervix. Scarifications are thus avoided.

Vaginal Celiotomy. F. A. S. Kautz[1] points out the advantages. The lower abdomen may be invaded vaginally—anterior to the uterus and posterior. Each offering some advantage, according to the indication for operation.

(A) Posterior: The vagina being exposed by a very broad speculum, the cervix is grasped on posterior lip and dragged forward and up. Transverse incision is then made at the junction of vagina and cervix. Blunt dissection along the posterior wall of uterus soon brings into the field the peritoneal fold of the pouch of Douglas. This is grasped by 2 forceps and incised between them,

Fig. 15. Improved vulsellum (Donald).

thereby opening the peritoneal cavity, where one is able by this very simple operation (1) to make a differential diagnosis between intra- and extrauterine pregnancies in otherwise obscure cases; (2) for a thorough examination of adnexa by palpation; (3) to loosen adhesions; (4) for the reposition of an incarcerated uterus where this cannot be easily effected by other means; (5) for removal of ovarian cysts that might be crowded into the pouch of Douglas; (6) and, of course, for simple drainage of any exudate that might be present; (7) for the opening of pelvic abscesses, and (8) as the first step in vaginal hysterectomy.

(B) The anterior route, somewhat more difficult of entrance and of wider range of usefulness, is as follows:

(1) Cincinnati Jour. of Med., March 1926.

The vagina exposed as before, both lips of cervix are grasped by volsella and dragged down and forward and, by transfixing with heavy silk, replacing the volsella at a later stage. Doing away with them as obstacles is of some advantage. A horizontal incision is made through the vaginal mucosa on anterior uterine wall, which is then dissected aside, being somewhat facilitated by a transverse incision at the cervicovaginal border. The bladder is exposed and, by blunt dissection with gauze and scissors, is freed from its uterine attachment and completely separated, bringing into view the glistening surface of the vesicouterine peritoneal fold, which is then grasped between forceps and incised. The following operations may then be completed: (1) The second step in vaginal hysterectomy. (2) Movable retroflexion and retroversion may then be corrected by grasping the uterus with one volsellum superimposed upon another until the fundus is delivered into the vagina, the cervix being crowded into the posterior fornix, which now permits of the vaginal shortening of the round ligaments. (3) Perforations of the uterus are easily dealt with. (4) Benign tumors—small myomata—may be excised. (5) Solid tumors of ovary may be delivered into vagina and so removed. (6) Ectopics may be dealt with in the same manner. (7) Smaller cystic tumors riding higher in the pelvis may be punctured and the sac dragged into the vagina, ligated and removed. (8) The production of sterility by resection of the tubes, which are easily delivered singly into vagina. (9) The correction of cystocele by entire separation of the bladder from the uterus and the closing of the plica beneath this; the vaginal flap resected and closure by continuous catgut sutures. In nulliparæ or those with very narrow vaginæ, a perineovaginal incision, uni- or bilateral, is sometimes of great advantage in the simpler operations, but is imperative in the removal of large tumors or cysts.

Conclusions: That vaginal celiotomy demands greater skill and experience than abdominal. The absence of an

abdominal scar is sometimes to be desired. There is an entire absence of the dangers and inconveniences of herniæ and fistulæ. Freedom from painful adhesions. Few subjective annoyances following operation. The very rapid convalescence of these cases, most of them being about in 8 to 10 days. The very low mortality. The advantage of being able to operate under spinal anesthesia in cases which cannot take a general anesthetic, no relaxation being required. The freedom of the danger of ileus. And most important of all, total absence of shock.

[In trained hands this route has all the advantages claimed, except that fistulae are relatively more common.—Ed.]

Technic of Hysterectomy. F. G. DuBose[2] claims complete hysterectomy by the method described is safer than subtotal. The median raphé between the inner margins of the levator ani is the beam supporting the pelvic floor. The cervix is not the keystone of the pelvic arch. It is tumor-bearing tissue, and should be removed along with the neoplasm and uterus. Focal infections from the diseased cervix and its glands do occur; not rarely, as is claimed. Supravaginal amputation is not as safe as a complete hysterectomy. If accidents follow the complete operation, they are the result of faulty technic. Six vesicovaginal fistulæ were admitted for operation during 1922-3. No two were from same surgeon, and 3 states were represented. His associate observed they had escaped this accident because of the free mobilization of the bladder forward, off both the cervix and anterior fornix; that the utilization of a fascial flap dissected off this cervical and vaginal area for closing the uterovaginal aperture in the pelvic floor had also prevented ptosis or prolapse of the vagina or of the remaining pelvic viscera.

The structure, to which attention is called, is the prototype of the levator prostatæ. It has either escaped

(2) Surg., Gynecol. and Obstet., June, 1926.

attention, or been dismissed with the terse description that the anterior fibers of the levator ani descend upon the sides of vagina. (In the male, the anterior fibers descend upon the sides of the prostate, and unite beneath it with the same muscle of opposite side, as a sling.) Careful dissection will demonstrate the same arrangement of muscle fiber fusing with its fellow over the upper vagina and cervix, forming a sling for cervix on its anterior or under surface when it is normally anteverted. Furthermore, these fibers are as distinct on the cervix as on the prostate. This muscle arises from the pubis, with the puborectalis, and follows its course back and internal to it along the sides of vagina, converging over anterior fornix and cervix, is inserted into the anterior surface of cervix at the isthmus, and fuses into the median raphé with the opposite side. This raphé is a strong fibrous band, extending throughout the midline portion of the uterovesical attachment. On either side the connection between the uterus and the bladder is of loose areolar tissue, and easily separated by blunt dissection in the lines of cleavage. Not so with the median attachment, which is firmly adherent, holding bladder in a longitudinal line firmly attached to cervix, which portion is separated with difficulty by blunt dissection. In a hysterectomy it is usually cut with scissors. This fibrous band begins approximately 1 cm. below the isthmus, portiosupravaginalis, and extends down and below on the vagina at its reflection on the cervix and between the vaginovesical attachment.

After the uterovesical plica of peritoneum is incised, and blunt dissection of bladder from the cervix is begun, it is found that lateral to the midline the dissection is easy. In the midline, the fibrous connection is dense and closely adherent between the bladder and cervix. So difficult is blunt dissection that frequently it becomes necessary to incise this raphé. As a matter of fact, it is always better after the dissection is done bilaterally to lift up this midline and cut the adherent tissue with

scissors. As soon as this is done, the bladder is pushed forward readily beyond the vaginocervical junction. An incision is made with the knife 2 mm. deep, and ½ cm. below (which point is immediately below the isthmus) the cut edge of the peritoneum, and carried transversely across the cervix. From this point, blunt dissection will push down and forward a second layer of tissue off of the cervix, and to a point on anterior vaginal wall from 1 to 2 cm. below its reflection on the cervix. If this band is lifted up, and spread out over the handle of a knife, examination will prove it to be muscular fibers which extend into and fuse with the levator ani.

The incidence of accidents to the ureters and bladder and the sequence of ptosis or prolapse of the pelvic viscera following hysterectomy will be either greatly lessened or avoided altogether. The statement that total hysterectomy is the choice and safer than subtotal hysterectomy is true, provided that total hysterectomy is done along the plans outlined above, and not, surely not, according to the generally-accepted technic. The element of individual skill is entirely ignored, for when a certain level among accredited surgeons is reached this factor is small indeed. The remote results: Recurrence, incidence of cancer in retained cervix, and troublesome leucorrhea, are avoided.

[Nothing new in this technic—published by Editor in 1919.]

Improved Technic for Intrauterine Packing. This is suggested by P. E. Spangler[3]: If more than one length of gauze is needed, unless difficulty is to be experienced in removing the gauze, it is essential that each successive strip be united firmly to the one that precedes it. In the past, the general practice has been to tie the ends of strips together by square knot. It has happened that, after the physiologic contraction of cervix, the large bulk of the knotted gauze offers considerable resistance to easy removal. So severe as to make necessary a general

(3) Jour. Amer. Med. Ass'n., Sept. 4, 1926.

anesthetic and a minor procedure to secure room for removal. It was to overcome this that the procedure was devised:

When the end of the first strip is approached, the second strip is started from its tube. In the beginning of the second strip, starting about 1 or 2 in. from end and cutting away from the end, one cuts a longitudinal slit slightly longer than the width of first gauze. Now, holding the beginning of second strip flat, one brings the end of the first up through the slit in second strip. Then the end of first is passed round under second strip and up over the opposite side to slit. The end of the first strip is passed down through the slit in second strip in the opposite direction from its first passage through slit. The loop thus formed is set by firm tension on all three ends. The two limbs of first strip are then grasped in sponge forceps, and the whole union is introduced into the uterine cavity as with the single strip. Care is taken to make sure the open end of the V formed by first strip is directed toward the fundus. The packing is completed as usual. Additional strips may be united as needed. The advantages are the union between the strips is strong and will not slip; the union forms a soft wedge that is easily removed.

[Complicated—when pack is needed, it is needed in a hurry.—Ed.]

Postoperative Complications

Parotitis. Simmons and Rand[4] give details of a case of *postoperative parotitis* in a patient of 27, operated on for repair of cervix and perineum, etc. The operation was under ether, lasting 5 min. Reacted satisfactorily. On 3d postoperative day complained of slight sore throat and the next day experienced a little difficulty in swallowing. Face slightly swollen on one side, painful and

(4) New Orleans Med. and Surg. Jour., September, 1925.

tender. Swelling over angle of jaw grew rapidly larger in 24 hours in spite of constant local ice packs. Fever with rapid pulse, morphia necessary. Patient suffered intensely with face and neck. Oral examination showed excretory papilla swollen and red with pus exuding on pressure. On 3d day since appearance of swelling parotid was drained. She felt relieved, fever curve dropped and swelling reduced as drainage became free. The condition now became one of localized abscess with adequate drainage. Silkworm-gut was placed deep in incision to facilitate drainage. Eventual recovery without complications except the infection ruptured into auditory canal, which was attributed to a slight delay in incising the gland.

In the one recorded by J. K. Narat,[5] patient, of 48, on 3d day after hysterectomy began to complain of stiffness in lower jaw and a numb feeling in side of face. A typical mumps was visible the following day. The leucocyte count was 16,900; the erythrocyte count 4,700,000, Hb. 80%. Hot boric acid and alcohol solutions ordered and a mouthwash every hour. The condition of the teeth was good. On 5th postoperative day, a fully developed parotitis on both sides present. The swelling was hard, and there was a bluish discoloration over affected area. Under continuous hot compresses, interrupted only by daily applications of therapeutic light the swelling regressed without any intervention and T. which reached 102.4° on 4th day after operation was normal on 12th.

Within 4 years, *9 examples of postoperative parotitis* occurred at the Roosevelt Hospital (N. Y.) and are referred to by T. C. Peightal[6]: Six within past few months, prior to which there was a free-interval of nearly 3 years. The 9 cases in question were 5 gynecologic and 4 surgical; and the former are subdivided into mild, moderately severe and severe.

(5) Med. Jour. and Record, Nov. 18, 1925.
(6) Amer. Jour. Obstet. and Gynecol., January, 1926.

(A) Mild—Age 59, radium applied under anesthesia. Age 32, extensive myomectomy. This type is probably due to some type of temporary duct obstruction, either mucus or swelling of the papilla, rather than from a diffuse inflammation of the gland elements. It would seem such cases are of more frequent occurrence than is generally supposed, for they may be readily overlooked, particularly if the local swelling is only of moderate size. They usually subside rapidly within a few days.

(B) Moderately severe—Age 26, complete abdominal hysterectomy and appendectomy. Age 59, hysterectomy (abdominal) for carcinoma. Age 30, rather extensive myomectomy. Appendix routinely removed. Such cases do not subside within a few days and the infection usually becomes general throughout the whole gland but does not proceed to active suppuration. After the first few days the pain disappears, and the massive induration, which subsides very slowly, is the chief characteristic. The blebs are, no doubt, most frequently due to continued ice application. Some advocate opening this type, but without fluctuation this would seem unnecessary. However, should such a process appear elsewhere on the body than the face, incision and drainage would, no doubt, be more frequently practiced.

(C) Severe—Age 40, complete hysterectomy for fibroid, and routine appendectomy. Here incision is necessary for suppuration.

[A serious complication, an unpreventable accident prolonging convalescence. Drainage along angle of jaw seems to speed result.—Ed.]

Postoperative Infection. Of 500 laparotomies referred to by C. Macfarlane[7] there were 35 infected wounds (7%). Of these 19 were superficial and 16 deep; nearly half (17) occurred in 113 operations for pelvic inflammatory disease. Six of these infected wounds followed gross contamination with pus from rupture or tubo-ovarian abscesses during operation,

(7) Amer. Jour. Obstet. and Gynecol., May, 1926.

while 11 occurred without such obvious contamination. Among 112 supravaginal hysterectomies for fibroid tumors, wound infection occurred only 6 times.

Would it be possible to diminish percentage of infections in this group by repeating some preoperative antiseptic precautions before closing the wound? In the attempt to answer this question they are now taking the following precautions before closure:

Soiled incision towels are removed.
The operating team remove their soiled gloves, rinse hands in alcohol, dry them, and put on fresh gloves.
Fresh incision towels are applied and the incision is closed with fresh instruments.
After closing the fascia, its upper surface, the fat and skin edges are painted with Tr. of iodin, 3%.

So far they have carried out these precautions in 10 operations for pelvic inflammatory disease and have had superficial infection of the wound in 2. They hope that a large series will prove these precautions to be worth while and that a diminution in incidence of infections will result.

Streptococcemia Following Hysterectomy for Fibroids. In his account of 2 fatal cases, H. B. Matthews[8] observes Norris found in his study of 2274 cases that 395 showed some form of non-malignant degenerative changes. Those degenerative changes that were frankly malignant he found to constitute 4%. The most important non-malignant changes are those due to: First, *passive congestion*, a condition caused as a result of the serous exudate from obstructed venous circulation—such as *(a)* edematous, *(b)* myxomatous, and *(c)* cystic degeneration; and secondly, *red hepatization* in which the degenerated areas appear bright red and on pressure exude a pinkish or pinkish-yellow fluid. There are two types of red degeneration generally recognized, viz., the thrombotic and the angiomatous. Such tumors are apt to degenerate quite rapidly and very frequently become infected.

(8) Med. Times, April, 1926.

[We have never seen the use of covering skin and leaving the fat exposed. In infections not only skin-edge, but all tissues, should be covered before enucleation is begun.—Ed.]

The case-reports exemplify, clinically at least, the characteristics of cases in which the fibroid tumor, or tumors, had, at some previous time, undergone some one of the above-mentioned degenerative changes—probably edematous or red hepatization—and had subsequently become infected. The trauma coincident with operation disturbed the quiescent infection, either within the tumor or in the tissue immediately surrounding it, which immediately caused, in Case I, a fatal streptococcemia, and, in II, a severe peritonitis with streptococcemia and death.

(I) Age 42, admitted Jan. 13. Two days later, supracervical hysterectomy with double salpingo-oöphorectomy. Death on 17th, blood culture showed streptococci. (II) Age 46, admitted Aug. 11. Sept. 23, panhysterectomy, right salpingo-oöphorectomy. Appendectomy. Death on 3d day. Blood culture positive for non-hemolytic streptococci.

As a result of this experience, Matthews believes the cause of death following hysterectomy or myomectomy for fibromyoma is not sufficiently accurate. That fibroid tumors are liable to undergo certain degenerative changes and when such occur, there is great likelihood of infection. That during operation, when it is evident that a previous infection has existed, as shown by adhesions, or when the tumor appears edematous, or is in a state of red degeneration, drainage—vaginal or abdominal—should be instituted. When drainage has not been done, and signs of ascending peritonitis appear, immediate culdesac drainage should be performed. In these cases, blood transfusion with drainage offers the best way of combating the infection. Prognosis in operations for fibroids should be guarded, because unless we can abso-

lutely rule out any previous infection, we cannot with any certainty prognosticate as to end-results.

[I have had similar experience in hysterectomy for degenerative changes—and concur with conclusions; our studies with the sedimentation test suggest that with its use we may detect latent infection in fibroids.—Ed.]

MENSTRUATION AND ITS DISORDERS

Menstruation

A Study of Menstruation has been made by Ludlum and McDonald[9]: They state in the smooth muscle of the stomach and intestines as viewed through the fluoroscope and recorded by radiographs, is a sensitive and

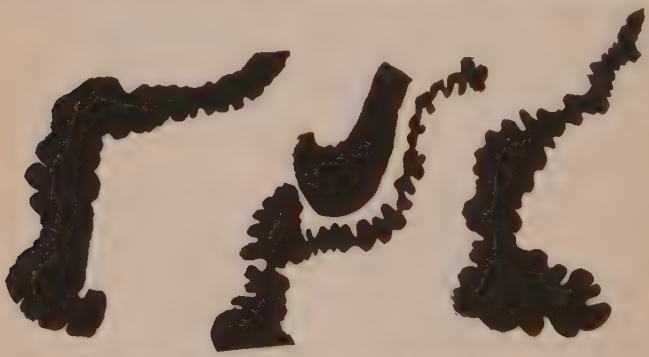


Fig. 16. Normal intermenstrual smooth muscle reaction of colon, showing 20 hour barium meal with normal haustra and normal innervation.

Fig. 17. Intermenstrual smooth muscle reaction of colon with vagus preponderance.

Fig. 18. Postmenstrual smooth muscle reaction of colon returning to intermenstrual condition (Ludlum-McDonald).

mobile mechanism which readily registers the action and condition of the vegetative part of the organism and is a manifestation of the action of the vegetative or autonomic nervous system. The vagus and its branches

(9) Surg., Gynecol. and Obstet., November, 1925.

stimulate the muscles and motor mechanism of the stomach to action and inhibit the sphincters. The sympathetic and its branches inhibit the smooth muscles of the stomach and intestines and stimulate the sphincters. Here in the delicate reactions of this large expanse of smooth muscle, as viewed by *x*-ray after a barium meal, is the best opportunity to record the condition of the vegetative part of the organism, and of the autonomic nerve-supply in the movements and arrangement of the

Fig. 19. Intermenstrual smooth muscle reaction of colon, showing some vagus preponderance in innervation.

Fig. 20. Menstrual smooth muscle reaction showing marked vagus preponderance (Ludlum-McDonald).

smooth muscle of digestive tract. The largest unit of smooth muscle in body, is also most capable of movement and alteration. They have called these manifestations and phenomena, the *smooth muscle reaction.*

From the present study their conclusions are that menstruation is a time of vagotonia or vagus stimulation and that this can be shown in the smooth muscle reaction of the intestine as pictured by the *x*-ray. The wave of vagus preponderance begins from 8 to 2 days before menstruation, reaches its height during menstruation and returns to the intermenstrual condition from 3 to 6 days after. There is some evidence that among other factors this vagus preponderance is, in part, at least, due to the accumulation of calcium in the blood and

tissues and that calcium is cast off at menstruation. It is possible that some of the preliminary pains of menstruation are due to intestinal cramps from vagus stimulation. Drugs and salts which reduce the vagus stimulation relieve the pain.

[In line with what is known of sympathetic excitation and inhibition, but still problematic.—Ed.]

The Histologic Interrelationships of Menstruation and Ovulation are considered by E. Novak[1]: The basis for our modern theory of menstruation is the belief that menstruation cannot occur without preceding ovulation. This belief is supported by a wealth of evidence, so it

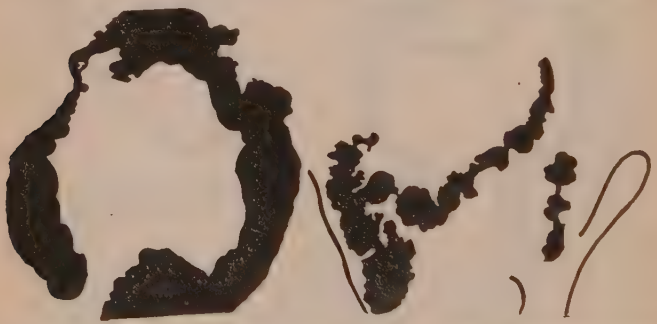


Fig. 21. Intermenstrual smooth muscle reaction of colon in case of dementia precox.

Fig. 22. Menstrual smooth muscle reaction in same patient, who was very much excited and worse during menstruation (Ludlum-McDonald).

is now accepted quite universally. The few exceptions, however, have been quite plausibly explained by Meyer. Aside from this, however, they cannot be put up against the innumerable observations possible to every gynecologist to convince himself of the relation between menstruation and corpus luteum formation. A mature corpus luteum, *e. g.*, will invariably be found just before the onset of a genuine menstrual flow. As Meyer points out, however, it may be absent in certain nonmenstrual

(1) Amer. Jour. Obstet. and Gynecol., December, 1925.

types of uterine hemorrhage, but such exceptions only go to prove the rule. While the past two decades have added much to our knowledge of the physiology of menstruation, there is still much to learn. No doubt, too, it will be necessary to unlearn some of our present conceptions. It is one of the most fascinating and fertile fields in gynecology, and bound up very closely with many subjects of everyday importance, such as the explanation of so-called endometrial implants, the etiology of so-called functional uterine hemorrhage, and the study of a number of interesting menstrual disorders associated with endocrinopathies of one form or another.

[Novak's articles are always of interest—and I agree that we have much to learn.—Ed.]

Disorders of Menstruation

Puberty Hemorrhage. S. A. Wolfe[2] reviews a series of 26 cases as to the clinical and pathologic features: This is a definite entity presenting as a menorrhagia or metrorrhagia in the absence of inflammation, neoplasia or pregnant state. The soft patulous cervix is pathognomonic; the body may or not be enlarged. Symptoms recur after curettage but are always controlled by radium. Curettings are abundant, thickened and frequently polypoid. This is the result of a diffuse glandular, stromal and vascular hyperplasia. Persistence of solitary ripening follicles or simultaneous maturation of multiple follicles accentuates a physiologic endometrial hyperplasia into a pathologic type. (These changes have been reproduced by Frank and others in animals.) Corpus luteum formation is absent. The uterus is the direct seat of bleeding. It results from thrombosis of the endometrial vessels and ensuing necrobiosis, and from actual mechanical rupture of engorged capillaries.

(2) Amer. Jour. Obstet. and Gynecol., July, 1926.

The factors inaugurating persisting, follicular cysts in the ovary with its concomitant endometrial hyperplasia, remain for future study. (Plate XV.)

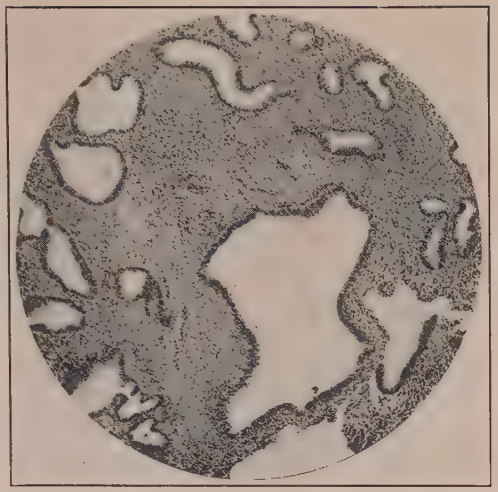
[200 mg. hours of radium within uterus, sometimes repeated, with blood transfusion, have cured all of our cases.—Ed.]

Treatment of Functional Climacteric Hemorrhage. This type, according to E. Novak,[3] may be seen at any age during menstrual life, but is most common at or near menopause. It is then commonly spoken of as functional climacteric hemorrhage. Its great importance at this period lies in the fact that it must be distinguished from cancer, which likewise manifests itself by abnormal bleeding. This form may also be noted at or near puberty ("functional hemorrhage of puberty"), and in spite of the youth it may become alarming. Most characteristically it occurs in the form of menor- rather than metrorrhagia, though the latter may also be seen. The endometrium, regardless of the age, almost invariably presents a very characteristic histologic picture designated as "hyperplasia." (1925 volume, p. 348.) It is a relatively common and very important lesion, still unrecognized in many clinics and laboratories. It is of undoubted endocrine origin, since it occurs only during the age of ovarian functional activity, that it can be invariably checked by removal of the ovaries or radiotherapy, and that it so often recurs after curettage.

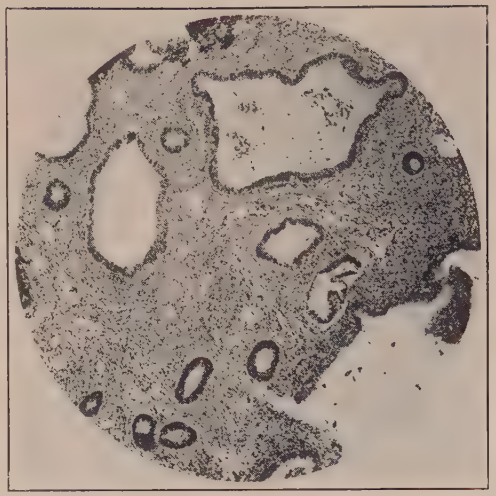
Mild cases may tend toward spontaneous correction, ostensibly because the disordered endocrine balance spontaneously adjusts itself. Where aid is sought, diagnostic curettage is clearly indicated and, besides enabling one to make the microscopic diagnosis, will in a considerable number be followed by permanent cessation. In a large proportion, on the other hand, bleeding recurs sooner or later, so further treatment is necessary.

Organotherapy is occasionally successful. The nature of the endocrinopathy is apparently not always the same,

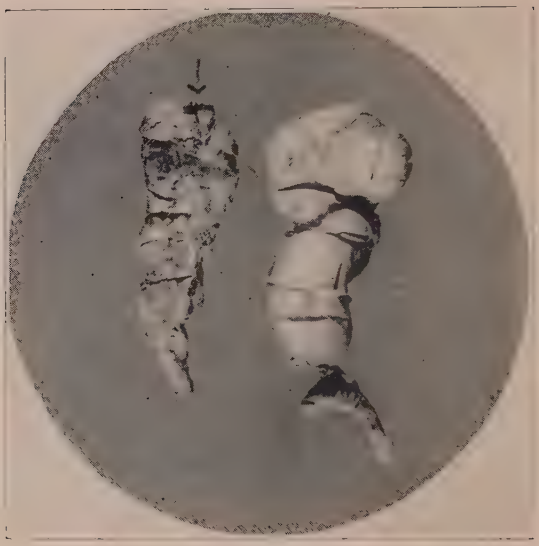
(3) Therapeutic Gaz., May 15, 1926.



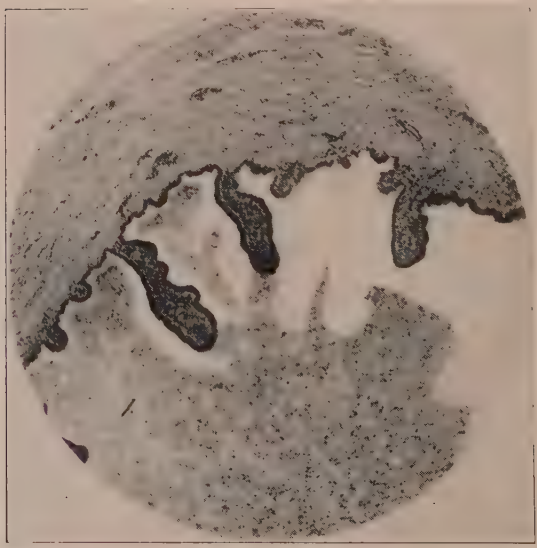
(*Case I.*) Note hyperplasia of glands and stroma. The huge glands are noteworthy of endometrial hyperplasia.



(*Case II.*) Stroma and glands are hyperplastic. The cyclic pattern has been lost, huge glands are prominent. Note the many injected capillaries.—Wolfe, page 383.



Gross specimens. Arrow at site of rupture.



Showing villi projecting into lumen.—Cox-Baugher, page 392.

so in some thyroid, in others the intramuscular injection of lipoid-containing corpus luteum extract, in still others the daily injection of posterior pituitary extract, is beneficial. The corpus luteum extract is perhaps the most rational, because absence of corpora lutea in the ovaries appears to be characteristically associated with the form of bleeding. Novak's best results have seemed to follow the daily use of pituitary extract. How much of the benefit has come from a specific endocrine effect of the pituitary substance, and how much is due to the increased contraction of the uterine musculature by the extract, it is, of course, difficult to state. In women at or near the menopause who suffer with persistent functional bleeding the indication is clear for radiotherapy, which after perhaps a single period of rather free bleeding bring on a complete cessation of the function. In young women much smaller and more cautious dosage is necessary to avoid permanent amenorrhea and sterility, and not a few gynecologists would prefer to avoid radium altogether, and to try to check the bleeding by other measures, *e. g.*, repetition of the curettage. Each case should be judged individually, and the patient or her family should be taken into our confidence. Finally, when for any reason radiotherapy is unavailable, or when there is some other indication for laparotomy, the bleeding can, of course, be checked by supravaginal hysterectomy.

[Curettage and the examination of the scrapings has a diagnostic significance—radium has perhaps its widest field in menopausal hemorrhages.—Ed.]

The Radiotherapeutic Menopause. The significance and management are discussed by J. A. Corscaden[4] based on 206 instances: He finds the only constant symptom is the so-called "hot flash." Associated with the hot flash there occasionally occur sensory disturbances, predominant among which are numbness and tingling in the fingers and a sense of stiffness in hands.

(4) Amer. Jour. Obstet. and Gynecol., June 1926.

A few over 40 appear to have increased blood pressure after the radiotherapeutic menopause; in each case explainable by kidney disease, mode of life, or emotional state. There were no cases under this age. Changes in the age appearance, secondary sexual characteristics, and libido have not occurred. Obesity has not occurred with any regularity. The basal metabolic rate has shown no change. Psychic disturbances are rare. The cause seems to be similar to that of other psychoses and not directly attributable to the loss of ovarian secretion. The management of symptoms and conditions following the radiotherapeutic menopause should be based upon general principles rather than upon the theory they are caused by the loss of the ovarian secretion.

[The endocrine balance is gradually reëstablished. The patient who regains her general health has no menopause symptoms except the hot flash, and if she lives in the open these seem to disappear.—Ed.]

Hemorrhage About—and After Menopause. In his post-graduate lecture, W. F. Shaw[5] divided the subject into 2 parts—(1) *Menorrhagia and Metrorrhagia About the Menopause.*

Carcinoma of the cervix is very common about the menopause, though it may occur at almost any age, and he has seen it as early as 22 and 24 years respectively. It is much more common in parous uteri, and is especially liable to commence in lacerations of the cervix. Usually the diagnosis is easy, as a friable area is found on cervix, and examination is followed by free hemorrhage. This sign alone should make us very suspicious of malignant disease, as should a history of hemorrhage after coitus. The only type which presents any difficulty is where the growth commences in the cervical canal and exposes only a tiny area of friable surface at external os. In any doubt the patient should be examined under anesthesia and a piece excised for microscopic examination; but this is rarely necessary.

(5) British Med. Jour., June 19, 1926.

[No menopausal bleeding should be treated without first excluding cancer by histologic examination. Diagnosis by biopsy specimen is important—such specimens from the cervix should be removed with the sharpest knife and wound immediately sealed by cautery—curet or "punch" favors metastasis.—Ed.]

Erosion of the cervix consists of a slightly raised velvety red area extending on to the vaginal surface of the cervix from the os. Hemorrhage is readily produced by the finger, and so this condition is that most likely to be mistaken for carcinoma; firm scraping with the finger generally settles the diagnosis, as the erosion extends only a few cells deep and the subjacent tissue is firm and resilient, whereas in carcinoma the friable tissue extends much deeper, and it is usually possible to dig out a fairly deep ulcer with finger. In a case of doubt one must examine under anesthesia and curet the cervix, or even, rarely, to excise a piece for examination. Erosion is not a primary pathologic lesion, nor has it any symptoms, but is merely the result of some irritating discharge, usually from the interior of uterus, and curettage generally cures.

Physiologic Atrophy of Muscle.—As a uterus approaches the menopause the blood supply diminishes and the muscle atrophies; normally these changes run concurrently, so the diminishing muscular tissue is able to exercise the same control over the diminishing blood supply as in vigorous life. If, however, the atrophy of the muscle outstrips the diminution of the blood supply the same control cannot be exercised and menorrhagia occurs. It is the knowledge that this physiologic change may explain the onset of hemorrhage which lulls our suspicion, and examination is often deferred in the hope this will prove the cause. The only treatment is pituitrin, ergot, or hydrastis—which will stimulate the weakening muscle to greater effort—but it is necessary again to emphasize the fact that these drugs must never be

administered without a vaginal examination to eliminate any possibility of carcinoma being the cause.

Subinvolution.—If involution does not progress normally during the puerperium the uterus is left enlarged and hard, but regular in outline and mobile, and usually gives rise to menorrhagia during all subsequent menstrual periods, but frequently menstruation is quite normal for some years, and then, as the patient approaches the menopause, menorrhagia commences and becomes worse and worse until she is compelled to seek advice. It seems curious that hemorrhage at the menopause should be caused by a lesion produced during a puerperium, possibly many years previously, and that menstruation during the interval should have been quite normal. During involution two main changes take place: the excessive muscular tissue is absorbed, and the large vessels are replaced by small ones. Instead of the old vessel merely shrinking in size, new vessels are formed within the old one, and at the same time the elastic and fibrous tissues in the old vessel walls swell up, soften, and lose their staining properties. In normal involution the old vessel wall is absorbed completely, leaving the new vessel to function in the involuted uterus. If involution is not complete, portions of the old vessel wall remain, and the internal elastic layer will remain permanently surrounding the new vessel; the less complete the involution the larger the amount of elastic tissue surrounding the new vessels. The increased bulk of a subinvoluted uterus is due to want of absorption of the muscle fibres, and so this uterus can exert a greater muscular control over the vessels, but to counteract this the vessels are surrounded by varying amounts of elastic tissue. If the elastic tissue is in preponderance the patient will have hemorrhage from the confinement; if the elastic tissue only equals the extra contractile power of the uterine muscle menstruation will be normal until the menopause is approached; then the muscle atrophies, and even though the blood supply diminishes in normal

amount the relationship between the two is upset, as the weakening muscle has to exert its effect on the vessels through the mass of inert elastic tissue, and so menorrhagia commences. The only cure of subinvolution is another pregnancy with a normal puerperium; but in these cases with late onset of the symptoms this is usually impossible. Pituitrin, ergot, or hydrastis will frequently diminish the amount of hemorrhage by stimulating the weakening muscle to fresh exertions; if this fails, curettage followed by these drugs is usually successful. If this also fails, it is necessary, in a few cases, to stop the hemorrhage by *x*-rays, radium, or hysterectomy; the latter is more generally useful, as there are frequently other complications—matted appendages, prolapse, etc. —which can be cured at the same time.

[It is interesting in confirmation of these statements that curettment removes practically no endometrium. —Ed.]

Chronic Metritis.—This term is frequently used clinically to include subinvolution or any bleeding uterus which is enlarged, hard, and regular in shape; but in a strict pathologic sense it means a uterus in which much of the muscular tissue has been destroyed by inflammation and replaced by fibrous tissue; this condition, by weakening the action of the muscular tissue, allows hemorrhage to occur, especially as the uterus approaches the menopause. Chronic metritis and subinvolution often occur in the same uterus. The only treatment is to administer pituitrin, ergot, or hydrastis, curet, and finally, if these fail, hysterectomy or radium.

Polypus.—Either mucous- or fibroid polypi frequently produce hemorrhage at this time. The diagnosis is easy, as the polypus can usually be felt by the finger. Occasionally a fibroid polypus is entirely within the uterus, and we can then do little more than suspect its presence from the fact the uterus is a little enlarged and possibly the cervical canal somewhat dilated. Examination under anesthesia and dilatation of the canal allows a definite

diagnosis to be made and at the same time the polypus to be removed.

[There is usually a symptom-complex which suggests the diagnosis, *i.e.*; a history of menorrhagia attended with menstrual pain, this in turn is followed by cramp-like (labor-like), then metrorrhagia.—Ed.]

(2) *Hemorrhage After the Menopause*

Carcinoma of the cervix is one of the commonest causes of hemorrhage after the menopause. The diagnosis and treatment is the same as before menopause.

Carcinoma of the body of uterus is not nearly so common as of the cervix, and does not occur before the menopause, although in some cases the period of amenorrhea is only very short. There are no physical signs except a slight enlargement of the body of uterus, and a definite diagnosis can only be made with the curet when the material removed is usually so characteristic that a definite diagnosis can be made without waiting for a microscopic examination, and so hysterectomy can be completed under the one anesthetic. Fortunately, simple panhysterectomy gives as good results as the extensive Wertheim's, and the mortality is much less. If examination of the cervix in hemorrhage after the menopause does not reveal any growth, curettage must always be undertaken to complete the diagnosis.

Senile endometritis is, fortunately, very common. The atrophic endometrium is readily attacked by organisms from the vagina, becomes inflamed, and produces hemorrhage. Curettage completes the diagnosis, as the endometrium is always thin, quite unlike the thick, cheesy material in carcinoma of body, and at same time curettage cures the condition. Senile endometritis is a definite inflammation, and the microscope reveals much small-celled infiltration.

Mucous Polypi.—The endometrium after menopause would not be expected to produce polypi, but they are not rare, especially at cervix and Shaw has met with at

least half a dozen in previous 6 months. They can usually be found protruding through os, and curettage —which cures—generally reveals no others.

[These polypi should be sectioned more frequently, for we believe many are epithelioma.—Ed.]

Dysmenorrhea in Industry. H. J. Cronin[6] remarks that dysmenorrhea causes marked economic loss to industry by the disability or absenteeism of valuable workers. Alleviation or prevention can be effected and disability from this cause be reduced as much as 50%. This was accomplished in a large factory employing 500 hands engaged in clerical or factory work. The general hygienic treatment consists of a balanced, anticonstipation diet, a 2-mile walk daily, 9 hours' sleep, with 10 the week preceding period. Swimming and floor gymnasium work are beneficial in preventing constipation. The bowels should be kept open with laxatives if necessary and three days before the period a saline, preferably Magnesium citrate, should be given even if there is no constipation present. A nightly tepid bath for a few days before the period will induce neurovascular relaxation. Luminal, gr. ½, the night immediately preceding if there is marked insomnia or restlessness. Anemia was treated with ferrous carbonate, grs. 5, with Arsenic trioxid, gr. 1/100.

When thought to be an endocrine basis for the dysmenorrhea, glandular treatment instituted. The nonsurgical hyperthyroid is treated with tepid baths, sedatives if necessary, Lugol's solution *m.* 1 to 5 *t. i. d.* and lutein, grs. 5, once to three times a day except the five days preceding and following the menses. When using Lugol's patient should be under strict observation because of the possible acute hyperthyroidism. The treatment of the hypothyroid case is by thyroid gland in regulated doses ranging from 1/10 to 15 grains daily.

In the dyspituitary group, which forms the largest class of endocrine cases with dysmenorrhea, the hyper-

(6) Amer. Med., December, 1925.

pituitary case is treated with the whole gland pituitary gr. ⅛ to gr. 1, in conjunction with lutein gr. 1-v, *t. i. d.* Thyroid gr. 1/10 to grs. 10 is also added if there are signs of a dysthyroid condition. In hypopituitary cases, in which there is usually a hypoplasia of several glands, mixed treatment consisting of thyroid, ovarian and pituitary glands gave the best results. Subcutaneous injections of anterior pituitary in doses of 1 c.c. are used in well-marked cases of hypopituitarism.

The mental attitude towards the menstrual function is important. Many girls insist that their mothers, sisters and aunts have painful menses and that they themselves will probably always suffer. Instead of looking at it as a normal function, stress has been placed on its abnormality, and subconsciously the patient exaggerates its associated discomforts.

[It is so difficult to demonstrate clinical hypo- and hyperfunction of the several glands—that endocrine therapy is largely empiric.—Ed.]

Bilateral Hematosalpinx With Rupture. Cox and Baugher[7] had under observation, a patient, aged 28. Admitted March 13, 10 hours after onset of severe pain in right lower abdomen. Vomited several times. Pain grew worse progressively. Last menstrual period was Feb. 1, but March 1 had a slight flow for day. At the outset of pain, March 12, noticed a slight bloody discharge which had continued up to time of examination. She had a spontaneous miscarriage 8 years ago, shortly after marriage. She did not become pregnant again although no precautionary measures were used. For past six months dull aching pain in both lower iliac regions at times and a moderate leucorrheal discharge had been noticed. Her last normal period extremely painful, necessitating her confinement to bed for one day. Ordinarily only slight pain, with no incapacitation. Upon examination was extremely pale, and had a rapid, weak pulse. She was markedly tender over the entire

(7) Illinois Med. Jour., January, 1926.

lower abdomen but more so in the lower right iliac region. Vaginal examination disclosed a boggy mass filling up right cul-de-sac, which was extremely tender. The blood count showed 3,640,000 reds with 68% hemoglobin. (Plate XVI.)

Immediate operation for supposed rupture of right ectopic. The abdomen contained much blood, fresh and clotted, with active hemorrhage from right tube, which was distended with blood and ruptured at fimbriated extremity. The left tube was markedly distended with blood but not ruptured. The ovaries normal. Both tubes were removed; uneventful recovery. The absence of histologic evidence, and the definite inflammatory changes in the tubes lead them to believe the underlying factor was a primary catarrhal salpingitis with subsequent erosion of tubal vessels. Torsion of the tube filled with blood probably predisposed to rupture.

Menstrual Psycopathies. M. Gommès[8] observes that nervous disturbances at the menstrual epoch are common; in subjects with neuropathic tendency, however, either congenital or acquired, such disturbances may become much more serious, and give rise to manifestations of anxiety or even frankly vesanic. The pathogeny of these sexual psycopathies is very obscure. Many theories have been advanced, but the most plausible are those which assume toxemic saturation of ovarian origin. In favor of this interpretation are the epileptic- and hysterical crises at the catamenial period. Hence the first aim of treatment should be to re-establish the disordered function, for the symptoms nearly always coincide with amenorrhea or dysmenorrhea. Ovarian opotherapy seems indicated always, but total ovarian opotherapy either gives no results at all or but few.

By previous investigations, Gommès claims to have discovered 2 active ovarian principles in ovary, with antagonistic action: One a hormone, activator of the menstrual function ("agomensine"); the other a regu-

(8) Gaz. des Hôpitaux, Feb. 6, 1926.

lator of the function (''sistomensine''). He made use of the former in a considerable number. In many subjects (young girls, as a rule), who during the epoch presented symptoms severe enough to call for seclusion, had total disappearance of the psychic manifestations at the same time there was return of the suspended function. The mental improvement always coincided with return of the function, and the latter reappeared very constantly after 4 or 5 tablets of agomensine daily for 7 or 8 days. In such subjects the mental disturbances are merely the evidence of luteinic toxemia in a frail and predisposed organism. Dissociated ovarian opotherapy by supplying the lacking ''agomensine'' enables the toxic substances to be evacuated *via* the menstrual discharge, and thus re-establishes the equilibrium of the endocrine system.

[Apparently an excessive retention of the sex hormone.—Ed.]

Cervical Sac With Retained Menses. A. P. Linton[9] states she was consulted—in Persia—by a patient, of 26, for abnormal menses with intense pain. She had never menstruated normally, but every month had very bad pelvic pain and slight oozing of brownish fluid. There was an indefinite history of discharge in youth. On examination there was an apparently closed vagina and neither cervix nor uterus could be felt, but, *per rectum*, a tumor could be defined high up, which it was thought might be the uterus. The patient begged for operation as, unless she was proved to have normal organs, she would be divorced. Linton operated, opening in the midline of the vagina. High up could feel something like a loop of thickened bowel; when pulled down found it was a non-vascular thick-walled sac with a small hole at side from which dark menses exuded. On cutting into this cervix found which she was able to pull down. The sac was attached all around it about 1½ in. above the os;

(9) British Med. Jour., March 27, 1926.

this was excised, leaving enough edge to sew it to cut vagina. When discharged vagina appeared normal. She menstruated a few weeks later without pain and has since become pregnant.

THE OVARY*

Effect of Thyroparathyroidectomy and Parathyroidectomy on Oestrous Cycle. Using the length and character of the oestrous cycle as an index of ovarian activity, a study was made by M. O. Lee[1] of the effects of thyroparathyroidectomy and parathyroidectomy in two groups of albino rats. The cycles following total thyroparathyroidectomy showed an average lengthening of 1.2 days, or 25% over those in controls. Following parathyroidectomy alone there was an average lengthening of the cycles of 0.6 days or 12% over controls. These results are considered as being due to the effects of the removal of the glands on general health and metabolism, rather than as a direct specific effect on ovarian activity. Trauma in sham operations and inanition due to clipping of incisor teeth gave similar results in controls. The effects of thyroidectomy and of parathyroidectomy on the cycles, seem to be additive when both are performed in same animal.

[Shows the interrelationship of the interglandular system, and the effects of hypofunction—anabolism.—Ed.]

Interstitial Gland-Cells in Ovary. A series of 43 pairs of ovaries from psychotic cases were examined by B. D. Lewin[2] and 2 ovaries each from a different case, showed in the hilum a small island of cells identical in appearance with the interstitial gland cells of testis. The clinical diagnosis in both cases was "senile psychosis." No functional features were to be correlated with this finding. If the cells exerted a "male" influence, the

(1) Endocrinology, January-February, 1926.
(2) Amer. Jour. Med. Sci., April, 1926.

*Ovarian tumors are grouped with other Benign and Malignant Tumors.

fewness of their number, or the presence of general senility, prevented this influence from manifesting itself. The possibility of overlooking the presence of such an island, when the ovary is removed in the usual routine necropsy manner, is pointed out. (Plate XVII.)

Standardization of Ovarian Follicular Hormone. Bugbee and Simond[3] carried out a series of experiments on 24 rats, in a period of 5 weeks, to determine whether or not the effectiveness of injections of extract of follicular fluid varies with the age of a rat and with its weight. The experiment indicates that the dosage of extract should vary directly as the weight of rat. The age is of importance only to the extent that it should have reached sexual maturity and not have passed the prime of life. For standardization of extract of follicular fluid the best rats are those between 3 and 11 months and whose estrous cycles are regular with the 4 to 6-day rhythm, before ovariectomy. To have a uniform standard they adopted the Allen and Doisy *rat unit*.* Potency of preparations is computed in terms of the *rat unit* by using the factor: weight of the rat divided by 140 grams.

*The rat unit is defined by Allen and Doisy as follows:

"Provisionally we wish to define a *rat unit* as the quantity of material necessary to induce estrus as judged by the smear method in an ovariectomized sexually-mature rat weighing 140, plus or minus 20 grams. For physiological reasons we generally make three injections at intervals of 4 hours. The *rat unit* then is the minimum amount so injected which produces full estrous growth in the genital tract. Although we are convinced that this method of testing is roughly quantitative, we have not yet made a careful study of its limitations."

Clinical Tests of Follicular Hormone. Pratt and Allen[4] state that injections of ovarian follicular hormone into monkeys and human beings, from which ovaries have been previously removed, produce growth in the uterus. Removal of the follicular hormone by

(3) Endocrinology, March-April, 1926.
(4) Jour. Amer. Med. Ass'n., June 26, 1926.

oöphorectomy or cessation of injections brings on menstruation in monkeys. Uterine growth and accompanying subjective symptoms similar to those previously experienced at menstruation have resulted from injections into patients whose ovaries have been previously removed. No bleeding approximating that of normal menstruation has as yet appeared in women. In one case of scanty and irregular menses in which the ovaries were still intact, a definite increase in flow and regularity has resulted from injections.

[See also Sex Hormone—Part I.]

For years we have used endocrines hypodermically with better results than when administered by os—the follicular hormone seems to have its stimulative effects on the endometrium.—Ed.]

A Specific Inhibitory Hormone of Corpus Luteum. This is contrasted with the female sex (follicular) hormone by G. N. Papanicolaou[5]:

The corpus luteum, in its function as an endocrine gland, has a definite inhibitory effect on ovulation and menstruation or estrus. The suppression of these phenomena during pregnancy is an example of this effect. The removal of the corpora lutea abolishes this inhibitory effect and accelerates the appearance of the next period, as was first demonstrated experimentally by Loeb. In experiments performed along similar lines with guinea-pigs, author found that after complete removal of the corpora lutea the ovulation and estrus return on the eleventh day, while in normal guinea-pigs estrus usually returns at the fifteenth or the sixteenth day. These findings indicate that the corpora lutea exert an inhibitory action, suppressing and delaying the process of ovulation in the rhythmic function of the ovary. The author used this inhibitory function of the corpus luteum as a criterion for studying luteal extracts and especially for recognition of specific luteal hormone.

(5) Jour. Amer. Med. Ass'n., May 8, 1926.

Most investigators are still using the standard castration test for their work with luteal extracts. Such a method prevents one from discriminating between the proper luteal and the female sex hormone. Positive as well as negative results have been reported, indicating that the female sex principle may or may not be present within the corpora lutea.

The proper luteal hormone and the sex hormone act in an entirely different way from each other and are, to a certain extent, antagonistic. The luteal hormone inhibits and delays ovulation and estrus, whereas the sex hormone rather accelerates these processes to a limited extent. The luteal, in a purified state, does not excite

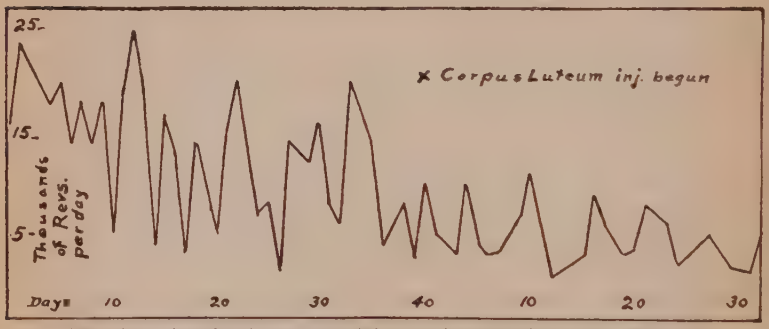


Fig. 23. Graph of cyclic activity of female white rat. The ordinates represent thousands of revolutions per day (Durrant).

estrus and does not cause hypertrophy in the genital tract of spayed females, as the sex hormone does to a striking degree. Both are active during pregnancy, but one inhibits, the other stimulates. The two, however, act simultaneously. The oral administration of extracts containing the luteal hormone gave no results, though large doses have been used. From a practical point of view, this method cannot be utilized at present.

The uniformity of results with a large number of tests leaves no doubt we possess a very simple method of iso-

lating the proper luteal hormone. No confusion seems possible between this and the follicular hormone. The sex hormone itself has been repeatedly identified in the corpus luteum, especially in early stages, in the luteal fluid and cysts. This has caused much confusion. The corpus luteum is evidently able to secrete both hormones; the sex hormone is probably secreted by the undifferentiated theca or granulosa cells, while the specific luteal hormone is probably formed by the fully-differentiated luteal cells, the latter increasing with the advancing development of the corpus luteum.

Effect of Corpus Luteum Extract. The effect of subcutaneous injection on voluntary activity in white rats has been investigated by E. P. Durrant[6]: A series of 15 animals was used, with 9 controls: and injections kept up for 37 days. The voluntary activity was unaffected in periodicity and total amount. Corpus luteum, therefore (assuming a potency of the extract used), does not prevent the formation of follicular hormone.

Ovarian Feeding, Especially With Glycerin Extract. A series of 6 case-histories is given by J. Rogers[7] who summarizes the indications for administration of the glycerin ovarian extract: For the neuroses at the normal or artificially-induced menopause without other discoverable organic cause. For some of the cases of obesity or rising blood-pressure which occur under these conditions. For functional amenorrhea and the neuroses or symptoms without other demonstrable causation which may accompany the symptom of amenorrhea or scanty menstruation. For relief of dysmenorrhea which, where it occurs without other neuroses, may only require the extract for a short time before and during the usually painful period. If there are other neuroses (without other discoverable cause) before or during or after the dysmenorrhea, the extract should be administered continuously for a considerable time.

(6) Endocrinology, May-June, 1926.
(7) Amer. Med., March, 1926.

[The results of clinical experience with ovarian extracts differ from those obtained in experimental work with the extracts on animals.—Ed.]

Basal Metabolism After Bilateral Oöphorectomy. This study by Geist and Goldberger[8] and associates, is based on 48 subjects: Summing up the results of investigations it would seem that castration in women with previously-functioning ovaries does not result in a consistent variation of the basal metabolism or body weight. There seems to be no definite relationship between the variations in weight and basal metabolism. Likewise the blood chemistry and pressure remain uninfluenced. The results may be due to *(a)* inaccuracy of our present clinical methods of examination, *(b)* influence of other important extraneous factors, *(c)* absence of any ovarian influence. The changes above mentioned are not of sufficient fundamental importance to warrant their being used as an argument for conservation of the ovaries.

[All such studies contribute something of clinical value.—Ed.]

Ovarian Grafting. In his consideration of this subject, W. Blair Bell[9] observes when the surgeon has decided it is impossible safely to conserve any ovarian tissue in normal position, the next consideration is the best mode of implantation. It is generally conceded autoplastic grafting should always be done; homoplastic is very rarely effectual; and heteroplastic is useless.

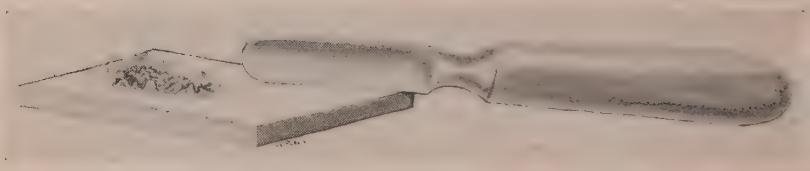
The ovarian tissue removed is separated from other structures, *e. g.* the tube, and a long silk thread on a sharp needle passed through it. The ends of thread are knotted together, and the ovary so tethered is placed in Douglas' pouch, or elsewhere in peritoneal cavity, the ends of thread being brought through laparotomy opening and held in forceps. In this way the ovarian tissue is kept moist and warm until required. When the primary operation has been completed, but be-

(8) Amer. Jour. Obstet. and Gynecol., August, 1926.
(9) Surg., Gynecol. and Obstet., December, 1925.

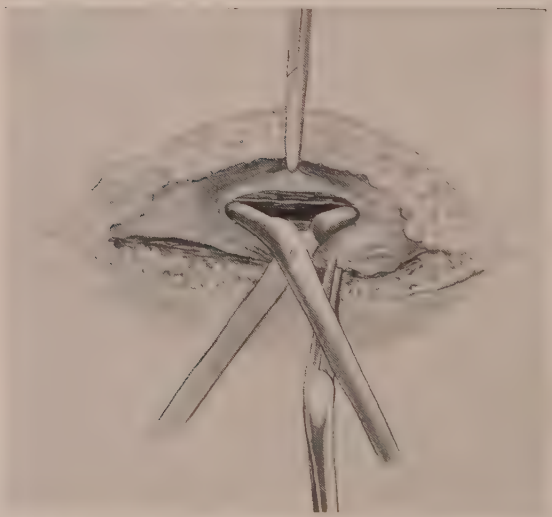
Ovary of Case I. *I.C.*, island of interstitial gland cells; *PV*, parovarial tubules.

Ovary of Case II. *I.C.* island of interstitial gland cells. —Lewin, page 395.

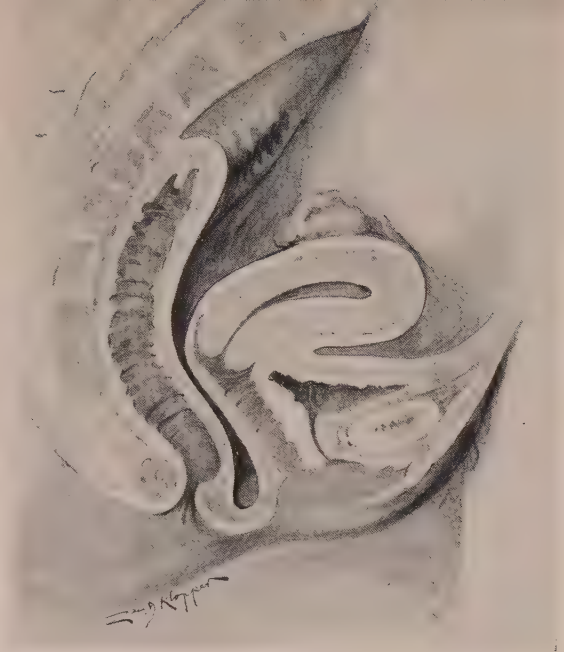
PLATE XVIII.



Having been cut up crisscross with sharp knife on rubber pad, ovarian tissue is ready for grafting.



Method of preparing bed in rectus for ovarian graft.—Bell, page 400.

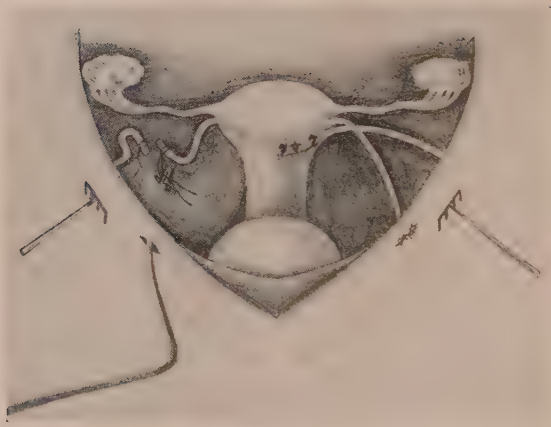


Congenital deep culdesac with peritoneum extending nearly to perineum.

Culdesac at normal level with ligated inverted stump of peritoneal sac. Three fine catgut sutures between vagina and rectum for obliteration of space between.—Glassman, page 405.

PLATE XIX.

PLATE XX.



The right round ligament has been divided and ligated. An Anspach round ligament-needle has been passed through a small incision in rectus sheath and is just emerging through the incision in peritoneum of the anterior surface of the broad ligament, preparatory to drawing through the free end of the proximal half of the round ligament for suture to rectus sheath. The completed operation is shown on left side; the proximal half of the ligament being sutured to rectus sheath and the distal half sutured to the anterior surface of uterus.—Carrington, page 410.

fore laparotomy wound is closed, the ovary is withdrawn and placed on a square of rubber 6 in. wide and about ¼ thick, which has been sterilized. A very sharp grafting knife is taken, and the hard cortex is shaved off the ovary or pieces of ovary, as the case may be. Then, by crisscross incisions, the whole piece is divided into small parts which are still held together by the underlying layer of tissue. (It is merely for convenience that ovary is not cut into separate fragments.) The exposure of such a large area of surface and the limited size of the fragments tend to ensure rapid vascularization of the implanted tissue. There is also less chance of follicular cyst formation.

Next, the aponeurosis covering the rectus on one side of laparotomy incision is seized with compression forceps and drawn towards operator, who with a knife carefully makes a small incision through the upper surface, avoiding all vessels. The blunt point made by the closed blades of a long angular compression forceps is passed through the opening in the sheath and gently forced into the body of the rectus *parallel to the surface.* The blades are then slowly separated. It is most important there be no bleeding, for, although grafts must be implanted in vascular areas, if the graft is bathed in blood it cannot become attached to the structures from which nutriment is to be drawn. The graft is now passed into the middle of muscle and laid flat among the fibers. The edges of the opening in the sheath are brought together with a couple of sutures, and the laparotomy wound closed. (Plate XVIII.)

If the infection in pelvis be recent and drainage is considered advisable a tube is passed through a stab outside the rectus to the bottom of Douglas' pouch; and in these circumstances the ovarian implantation is made in the external oblique close to the drainage tube.

Bell has also grafted the ovarian tissue into the uterus, or into what was left of the organ; and has wrapped it in the free border of omentum. But consid-

ering the ease with which the whole procedure just described is performed, and the advantage of the site for subsequent observation, implantation in the rectus, which satisfies the requirement of vascularity, is preferable to grafting elsewhere.

TOTAL NUMBER OF CASES RECORDED, 187

Indication for graft:

A. Salpingo-oöphoritis—173
   - Primary lesion (including 4 cases of puerperal infection) 157
   - Associated appendicitis 4
   - With fibromyomata 11
   - With tubal gestation 1

B. Innocent neoplasms of ovaries—13
   - Endometrioma 4
   - Other neoplasms of both ovaries, or of remaining ovary 9

C. Ovarian pain with functionless uterus 1

TOTAL NUMBER OF CASES EXCLUDED, 69

A. Operation within 6 months 9

B. (1) Died after operation (Mortality rate 1.07 per cent.) 2
   (2) Have died since from other causes 2

C. Failure to obtain complete after-histories 56

TOTAL NUMBER OF CASES ANALYZED, 118

A. Total cases in which menstruation was possible 107
   - symptoms 21 (20.0%)
   - No menstruation and menopausal symptoms 15 (14.0%)

B. Menstruation impossible owing to supravaginal or complete hysterectomy .. 11
   - No menopausal symptoms 6 (54.5%)
   - Menopausal symptoms 5 (45.5%)

C. Functional results in 98 (83.0%)
   - Failure to obtain functional results in 20 (17.0%)
   - Menstruation occurred in 71 (66.3%)
   - No menstruation and no menopausal

[Surprising results which have not been duplicated by other surgeons—probably because of faulty technique. —Ed.]

End-Result of Ovarian Grafting. P. Thévenard[1] had occasion to perform total hysterectomy on a patient, aged 41, on whom 13 years previous, Tuffier had done

(1) Paris Chirurg., December, 1925.

ovarosalpingectomy on right- and salpingectomy on left side, with partial resection of uterus and reflection of latter, after graft of left ovary into uterus. The specimen showed in addition to a mucous polyp at fundus close to left cornu, a mass of minute cysts at isthmus, which on section appeared to the naked eye as an ovary in sclerocystic degeneration. However, histologic examination proved this was cystic sclerotic endometritis. At no place was there any trace of ovarian tissue, hence graft had disappeared completely.

Moreover, in spite of the graft menstruation never returned after the former operation, while there were frequent pains on left side, coming on in crises which obliged patient to stop work momentarily; lastly two or three times each year there was metrorrhagia lasting for several days, profuse enough to require rest in bed. For some months pains on left side had been increasing in frequency, and woman demanded to be freed of the rest of internal genitalia.

[The life of the ovarian graft is always problematic. —Ed.]

Partial Hysterectomy With Conservation of Ovary. Reference was made by P. Lecène[2] to an operation by a colleague: Patient less than 40, partial hysterectomy done for fibroma, with removal of right- and preservation of portion of left ovary. The menstrual flow has continued, less profuse but quite regular, and the premature menopause—often attended by serious consequences—did not occur. This procedure is very good, and is not resorted to often enough. To keep up the menstrual flow, both ovaries can be preserved, or only one, or even a fragment, with a certain extent of the uterine mucosa (1 to 1.25 in.)

In the discussion, Ch. Dujarier said he had done the operation several times, but on one occasion the flow did not return, despite conservation of an ovary and part of the uterine mucosa.

(2) Gaz. des Hôpitaux, March 31. 1926.

B. Cunéo insisted on the importance of preserving the menstrual function in patients still young.

[In our experience an ovarian graft, or a conserved ovary, has a longer life if the endometrium is retained. —Ed.]

Intra-Abdominal Hemorrhage of Ovarian Origin. This is discussed by D. Feiner[3]: A girl, of 14, was admitted complaining chiefly of pain in right lower quadrant. Three hours before had an acute onset of cramp-like pains in iliac region, severe for a half hour, then diminishing, to be present only on pressure, accompanied by nausea and vomiting. Patient has always been well. Menstruation began at 13, was of 28-day type, (irregular, coming every 30 to 40 days) of 5 to 6 days' duration. She had to go to bed during last period which came a week early, 6 days previous to admission. The abdomen rigid and tender over right with some tenderness over left lower quadrant. No masses felt. Rectal examination showed a small anteflexed uterus. Nothing definite made out in region of the adnexa, on account of the pain. Pre-operative diagnosis: acute appendicitis. T. 100°; P. 90.

The abdomen was opened and the bluish shimmer through the peritoneum indicated an intraperitoneal hemorrhage. The peritoneum was divided and much blood escaped. Further exploration revealed the source to be a small rent in a follicular cyst the size of an almond, on left ovary. Here, likewise, the point of perforation, with the cyst cavity, was filled with small clots. The appendix showed no gross pathology. The ovary was resected, the cystic portion being excised; the convalescence was smooth. Microscopic examination of the specimen showed the usual structure of an atretic follicle, clinically designated as a follicular cyst; no evidence of endometrial implant.

This example represents a group occurring in girls of adolescent age during one of their early menstrual

(3) Surg., Gynecol. and Obstet., May, 1926.

periods. Schumann considers that such hemorrhages are more or less functional errors; *i. e.*, are the result of an excess of bleeding from the wall of the mature Graafian follicle in the adolescent ovary, and there is no demonstrable morphologic change present in the tissues.

[This accident simulates ectopic rupture.—Ed.]

DISPLACEMENTS AND INJURIES

Displacements

Improved Operation for Deep Cul-de-Sac was devised by L. Glassman[4] to obliterate the cul-de-sac permanently at a nearly-normal level. It requires both vaginal and abdominal work, thereby obtaining the great advantages of securing the sac from below and of permitting the use of it as a safe guide in the abdominal work.

The vaginal operation consists of an incision of any shape on the posterior wall which will permit entrance into the deeper structures; denudation of the vaginal mucosa; and excision of the redundant portion. Underneath this mucosa and in front of rectum, the peritoneal sac is found. The sac is bluntly dissected from its attachments up to the required level, which should be approximately 3 in. from perineum. The freed sac is picked up with forceps and may be inverted without being incised. The incising at this time, however, offers several advantages: 1. Demonstration of entrance into the free peritoneal cavity. (The exposed peritoneal surface is recognized by its shiny appearance.) 2. Digital exploration of sac. 3. Easier handling of the sac if further dissection is required. The incised margin of peritoneal sac is grasped with forceps, inverted and pushed up into cul-de-sac. The forceps are gently withdrawn. If necessary this temporary inversion may be reinforced and supported by a small sponge in sac (re-

(4) Surg., Gynecol. and Obstet., June, 1926.

moved later through abdominal stage). With 2 or 3 very fine sutures the space between rectum and vagina is obliterated. A high attachment of vagina on rectum is not required as the redundant vaginal mucosa has been excised, and there has been no prolapse of rectal wall. (As a rule, rectocele is not associated with a congenital deep cul-de-sac.) If latter should have become complicated with lacerations of the Levator ani, then these muscles will have to be brought together by several interrupted sutures. The closure of the posterior vaginal wall is accomplished with a simple continuous catgut suture approximating the margins of the mucosa. This is immediately followed by the abdominal procedure which, after the opening of the abdomen, placing the table in Trendelenburg position and packing off the bowel, requires the uterus to be pulled up thereby bringing the cul-de-sac into better view. Immediately the incised edge of peritoneum that was inverted through the vaginal route is noticed. (If a sponge was used from below as a support, it is now withdrawn.) The freed incised sac is grasped with forceps, drawn farther up into the peritoneal cavity and ligated with a suture ligature at its base at a level of nearly-normal cul-de-sac. The sac of peritoneum above the ligated point is cut off. Other work in the abdomen that may be required is now done. (Plate XIX.)

[Deep culdesac is often the cause of recurrent rectocele after perineoplasty—hence this operation has a place.—Ed.]

A "Shelf" Operation for Certain Examples of Visceroptosis is recommended by V. Bonney[5]: The technic follows: The abdomen having been opened the round ligaments are pulled up and a puckering suture run along each, starting about 1 in. from where ligament leaves abdomen and ending at attachment to uterus. This suture, when tied, pleats the part of the ligament sutured, so it forms a solid excrescence, attached to the

(5) British Med. Jour., Sept. 4, 1926

side of the uterus, which is presently used to suspend that organ. The suture should be passed through the ligament itself, not merely through the peritoneum covering it, and the tied ends are left long. Starting from the edge of the wound, the round ligament forceps are passed out between the abdominal aponeurosis and the rectus until their point reaches spot where the round ligament leaves abdomen, and then, still keeping the forceps subperitoneal, inwards under the peritoneum just in front of ligament, until forceps point reaches

Fig. 24. Position taken up by intestines when uterus is retroverted (Bonney).

where the pleating suture has been tied. The point is then thrust through peritoneum, the long ends of pleating suture are seized, and forceps withdrawn the way they came, bringing the ends of suture with them. Traction on these sutures pulls the pleated part of the round ligaments against the abdominal wall to which they are subsequently fixed by passing the two ends of each

suture through the aponeurosis on either side and tying them there. This method of round ligament-shortening effects a stronger suspension of uterus than the older method in which merely loops of the ligaments were employed. The method leaves no gap through which intestine might make its way. The uterus itself has now to be attached, by passing two silk sutures through the upper part of its anterior wall, which also pass through the aponeurosis and peritoneum on either side of the wound. Before, however, tying these sutures, it

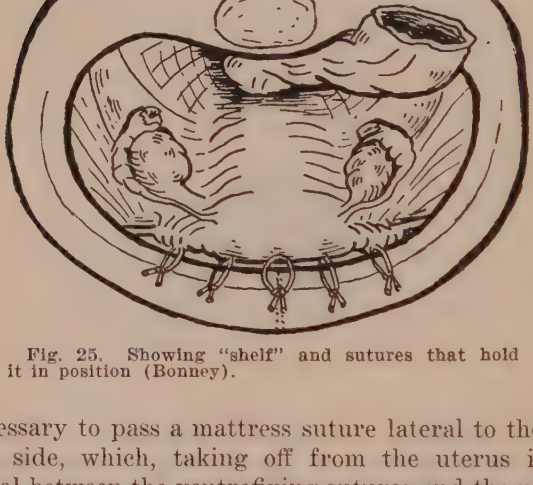


Fig. 25. Showing "shelf" and sutures that hold it in position (Bonney).

is necessary to pass a mattress suture lateral to them on either side, which, taking off from the uterus in the interval between the ventrofixing sutures and the pleated ligament, perforates the peritoneum and aponeurosis some ½ in. outside their cut edges, and is tied there. The object of these sutures is to close the gap, which would otherwise exist, between where uterus is ventrofixed and round ligaments are attached. The wound is then closed as usual.

The technic described results in the formation by the uterus and broad ligaments of a partition running trans-

versely across abdomen, entirely separating it from the uterovesical space. This partition in the standing posture forms a shelf on which the intestines rest. Moreover, the front portion of the abdominal cavity is shortened by some 3 in., so the drag on the mesenteries is diminished by that amount, while the intestinal pressure is directed down and back into an opened Douglas'

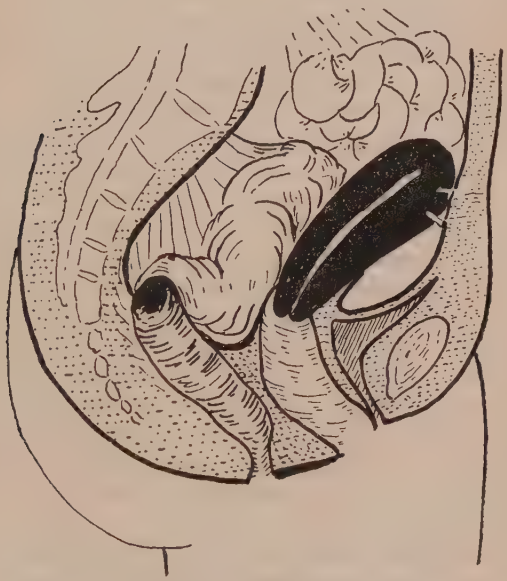


Fig. 26. Showing how the "shelf" alters position of the intestines (Bonney).

pouch. Bonney has been performing this operation for some years with successful results, and all the patients have been materially benefited. Care should be taken to fix the uterus sufficiently high to give the bladder ample room, and silk used for the main fixation sutures.

There are certain variations applicable to special cases: The combination of symptoms of enteroptosis with menorrhagia either due to fibroids or uterine fibrosis is

not uncommon. In such cases, if we cure the menorrhagia by hysterectomy, we make the enteroptosis worse, for a new space of considerable dimensions is created, into which the intestines, already prolapsed, will prolapse further. It is not, however, necessary, as a rule, to remove the uterus. With fibroids the tumors should be enucleated and the sutured uterus used to make the "shelf" in the manner described. This is the more desirable because after myomectomy suture of the uterus to the abdominal wall along the line of the incision in the uterus (which should be on its anterior wall) is good, as it safeguards against oozing from uterine wound. When the bleeding is due to fibrosis there are no discrete tumors to enucleate, but even here removal of the organ can be avoided, for through an incision in its anterior wall all the endometrium can be excised, and when the uterus is sutured it becomes a solid column of muscle without any cavity left to bleed from, and this solid column can be ventrofixed to form the centre part of the shelf. When the cecum is markedly prolapsed he sutures its caput to the back of right broad ligament, which forms the right-hand portion of the shelf, so as to prevent this portion of bowel sinking into pelvis. Similarly the pelvic colon can be sutured to the back of left broad ligament, if there seems any advantage.

[The selection of a round ligament depends: (1) on the relation of the ligament to the mesosalpinx. (2) Upon the tone and size of the ligaments. (3) The weight and size of the uterus. (4) On the position and invagination of the cervix. Each case must be individualized. Bonney's procedure has been of value in our hands.—Ed.]

Round Ligament Operation for Uterine Displacement. This, according to G. L. Carrington[6] is suitable in selected cases: In the hands of competent surgeons good results have followed the procedures now commonly used. There is, however, an occasional patient in whom the round ligaments are so attenuated that there

(6) Surg., Gynecol. and Obstet., October, 1925.

remain only a few strands of muscle fiber covered by a fold of peritoneum. When the surgeon opens the abdomen of such a patient he feels that there is need for something more than the usual operations.

Deciding to do a Simpson suspension, in the attempt to bring one of round ligaments extraperitoneally for suture the ligament was torn in two. He then ligated the ligament on each side of tear, and used the free end of proximal half for suture to rectus sheath, just as loop would have been fixed in Simpson operation. The distal was then carried over proximal half and sutured to anterior half of uterus, and the two halves sutured together where they were parallel and close to each other. (It will be seen the first part of operation after division of ligament is practically identical with that in the Simpson operation.) A small incision having been made in the rectus sheath and one in the anterior leaf of broad ligament, an Anspach round ligament-needle or Kelly clamp is passed through the incision in the rectus sheath, carried extraperitoneally to the little incision in the anterior leaf of broad ligament, the free end of the proximal half of the divided round ligament grasped and pulled extraperitoneally up to rectus sheath and sutured to sheath. The distal portion of the round ligament is then slid over the proximal portion, care being taken not to strip back the broad ligament peritoneum from round ligament. The free end of the distal half of round ligament is then sutured to the anterior surface of the uterus and the broad ligament peritoneum attached to it also sutured to the uterus. The proximal and distal halves of the round ligament are then sutured together for the distance they lie parallel and in close proximity to each other. The procedure can be varied by perforating the broad ligament and carrying the distal portion of round ligament through perforation and then suturing it to the posterior surface of uterus, thus performing a sling operation somewhat similar to the Baldy-Webster, combining, as it were, the Simpson

and Baldy-Webster operations instead of the Simpson and Coffey as in the present case. The same procedure, of course, is carried out on both sides. (Plate XX.)

[This, I think, is the 97th operation on the round ligaments which has been discussed for the correction of retroversion of the uterus—one of them may do good.—Ed.]

Retroposition of Uterus: The "present-day estimate" is furnished by J. F. McGrath[7]: A study of 1000 consecutive cases at Cornell University Medical College shows facts as follows:

RETROPOSITION OF THE UTERUS

	Single Women		Married Women	
	No.	Per Cent	No.	Per Cent
Pathology				
Complicating pathology demonstrable	53	53	816	90
Cervical disease	38	38	721	80
Adnexal disease	10	10	486	54
Adherent retroversion	11	11	261	29
Plastic dystocia, cystocele, prolapsus, etc.	2	2	414	45
Symptomatology				
Leucorrhea	48	48	668	74
Dysmenorrhea	67	67	386	42
Backache	32	32	375	41
Menorrhagia	7	7	81	9
Sterility				
Of the 900 married women, 214 had never been pregnant.				
In 73, sterility was the chief complaint; 686 had been pregnant.				

The conclusions drawn from this study are: Congenital retroposition is rarely symptom-productive and seldom requires treatment. Symptom-productive retroposition of the uterus of the acquired type is most common among patients who have been pregnant. Symptom-productive retroposition will show on careful examination associated conditions, and the diagnosis will quite certainly be confirmed at operation. More efficient and extended postpartum care will greatly lessen the

(7) Surg., Gynecol. and Obstet., February, 1926.

incidence of acquired retroposition. The vaginal pessary when properly used is of undoubted value and should be more frequently used to promote proper postpartum involution. Any operation that carries with it the risk of intestinal obstruction or uterine dystocia should be condemned. The Simpson-Montgomery technic with proper care of associated defects offers the best prospect of cure. In a few selected cases the Baldy-Webster is superior.

[Marriage, infection or pregnancy change a congenital symptomless retroversion into the symptom- production type.—Ed.]

Mobile Retroflexion. C. Meyer-Wirz[8] states that at Walthard's clinic, in 4 years there were 5200 gynecologic patients, and 507 had retroflexion, (not including retroflexion at climacteric and with prolapse). The symptoms and end-results are shown in table:

	Cases	Pessaries			Operative		No Local Treat
		Result Good	Not Traced	Func. Good Anatomic	Good	Not Traced	
No Symptoms	148	.....	.....	.....	.....	.....	.....
Backache	106	7	29	4	10	4	52
Compression of Rectum	61	20	20	2	5	2	12
Vesical Disorders	14	2	2	.....	2	.....	8
Reflex or Nervous Symptoms (Gastralgia, Migraine)	8	3	.....	.....	.....	.....	5
Dyspareunia	8	3	.....	.....	.....	.....	5
Menstrual Disorders—							
Menor- and Metrorrhagia	77	16	6	1	4	.....	50
Dysmenorrhea	11	1	2	.....	.....	1	7
Sterility—							
Primary (Nulliparæ)	23	2	.....	.....	2	1	18
After labor	4	1	3	.....	.....	.....	.....
Disorders of Pregnancy and Puerperium—							
Multiple Abortions	39	2	3	.....	3	.....	31
Incarceration Gravid Uterus	2	2	.....	.....	.....	.....	.....
Retained Lochia; Subinvolution	6	1	.....	.....	.....	.....	5
	507	60	65	7	26	8	193

(8) Schweiz. med. Woch., Feb. 13, 1926.

The results in 113 instances of Alexander-Adams operation in private cases (1905-24) are set forth in another table:—

	Anatomic		Functional		Total
	Good	Re-curred	Good	Not Traced	
Backache, compression rectum, vesical disorders	25	2	15	10	25
Menstrual Disorders—					
Menor- and metrorrhagia	23	1	21	2	23
Dysmenorrhea	15	.....	7	8	15
Sterility—					
Primary (Nulliparæ)	32	.....	15	17	32
After labor	9	.....	5	4	9
Multiple Abortions	9	.....	5	4	9
	113	3	68	45	113

[Mobile respositable retroversions can be retained by a pessary—and may even be cured.—Ed.]

Retroflexion was another of the "Symptoms Without Signs" referred to by C. Oldfield.[9] For over 20 years he has regarded this as a normal variation in position, and has not done ventrosuspension or used a pessary. It was the unsatisfactory results of such treatment which first led him to think retroflexion was not abnormal. All have observed cases attended by symptoms that could not in any way be attributed to it, *e. g.*, gonorrhea, carcinoma, climacteric symptoms, ovarian tumors. Also that the uterus may position from the posterior to the anterior or *vice versa* without any alteration of symptoms.

Analysis (by a colleague) of 1000 deliveries examined on 12th day after labor: Retroverted uterus was found in 50 cases; of these 32 were examined six months later. In 30 the uterus was found anteverted; 2 remained retroverted. One may reasonably assume from the fact that retroflexion is not rare, that in many of the 1000 patients the uterus which was in the anterior position when the patient left hospital would become retroflexed

(9) Edinburgh Med. Jour., July, 1926.

later on, otherwise only about 5 of the 1000 cases would have retroflexions six months after labor, which small proportion is extremely unlikely.

Some patients are relieved of symptoms after a pessary is inserted, but in many such cases Oldfield has observed the uterus still remained in the posterior position. No doubt the relief which a pessary gives is in some cases due to the fact that patient had prolapse, which may not have been detected.

If only the words "retroflexion" and "retroversion" and such terms could be discarded, the profession would soon forget the old doctrine and cease to use pessaries or operate for retroflexion. The question is of serious importance, for many patients are made unhappy by being informed that their uterus is twisted or bent back, and many suffer chronic ill-health after a pessary has been inserted. Not the least of the dangers of the old conception is that it leads to the diagnosis of retroflexion in such cases as pelvic inflammation, ectopic pregnancy, ovarian tumor, and other gross diseases and sometimes with serious consequences. In January, 1925, Oldfield received a letter from a gynecologist about a patient who had consulted him for sterility. He wrote that the uterus was retroflexed and slightly enlarged, that he had passed a sound into the uterus but had failed to lift it into the anterior position and advised ventrosuspension. In March, 1925, she came to see Oldfield because she had missed two periods. She was pregnant and uterus was lying in anterior position.

[One should distinguish between retroversion and retroflexion—the latter is always acquired, always develops a pathology. The pessary is used to retain the reposited uterus in normal position.—Ed.]

Nearly all writers mention conditions which complicate retroflexion (Findley only 4% free), giving inflammation, fibroids, prolapse, endometritis, etc. Most of us would regard these as the real disease, whatever our views may be of the significance of retroflexion. If

gynecologists still remain so obsessed by the word "retroflexion" that they are led into such a fallacy as to regard gross diseases such as mentioned as complications of the backwardly-placed uterus, it is not surprising that patients should consider retroflexion a condition to be anxious about. For these reasons let us drop "retroflexion" and have less confusion.

Conservative Treatment of Uncomplicated Retrodisplacement. P. B. Bland[1] observes we are all familiar with the conservative trend in treatment, and this does not indicate the trouble is less frequent, but that a mature surgical conscience has discovered therapy is rarely necessary. In the future it is probable that simple malpositions will be regarded more from a physioanatomic and not from a pathologic standpoint. Today the round ligament operation in uncomplicated cases, he rarely recommends or performs.

The only type of displacement which one may legitimately place in the category of a surgical displacement is the large hyperplastic- or the large chronically-inflamed adherent- or the pathologic-prolapsed uterus. In these, considerably more surgery than simply shortening the round ligaments or fixing uterus forward is called for. The practice of major surgery for a minor condition is not good surgery, and it is prudent to keep in mind that all forms of surgery exact a definite toll of human life.

If one may regard a multiplicity of measures as sound evidence that none are wholly satisfactory, then at least some of those designed for simple retrodisplacement may be included. Over 100 different operative methods have been devised and next to the pernicious operation of dilatation and curettement, Bland is not familiar with any that have had less justification or done less good. Ten years ago the round ligament operation constituted over 10% of the work of the gynecologist. Today it could be reduced to less than 2% and all that is needed

(1) Amer. Jour. Obstet. and Gynecol., July, 1926.

is a righteous surgical conscience. In simple cases it may be used occasionally for expediency in the course of other pelvic work, but rarely as a matter of principle or on primary organic grounds.

As regards the therapy of anteflexion it seems physically impossible to correct an ill-developed anteposed uterus by either medical or surgical means. Personally, he believes a grossly maldeveloped anteflexed uterus will remain maldeveloped and probably anteflexed forever, irrespective of any treatment. So far as therapy is concerned, uteri of this form might legitimately be placed in the category of incurable conditions. If, however, the ill-development is moderate, some good may be accomplished by a restricted dietary régime, combined with organic drugs. Apart from these measures, and even they afford but slight encouragement to either patient or physician, there is little one can do. Surgery in the form of dilatation and curettement alone or combined with a stem pessary or the various mutilating operations on the cervix itself, may occasionally provide some comfort, but surgery, too, generally is disappointing, is not without features inimical to the integrity of the cervical mucosa and indeed not without even more serious danger.

In the discussion, J. O. Polak said it is refreshing to note that posture, pessary, and tampon are at last recognized as definite measures of treatment in pelvic displacement. There is no question that the uncomplicated congenital retroversion produces no symptoms, provided the woman does not become infected, does not get married or does not become pregnant. If any of these things come to pass we may find a definite train of symptoms, because of the tendency to circulatory stasis in the broad ligaments. The pity is that the younger men do not appreciate what can be done in these cases by patience and persistence in the use of the pessary, posture, and tampon. Retroversion, the result of infection, childbirth or interrupted coitus, causes a good deal of disturbance.

He agrees with Bland that the so-called "anteflexion" is part of the symptom-complex, endocrine imbalance.

Kangaroo-Tendon Suspension of Uterus. D. H. Doherty[2] states some changes have been made in technic since first described by DuBose (1919): *(A)* the substitution of a large kangaroo-tendon for the then used-linen, or silk thread. *(B)* This kangaroo-tendon follows as closely as possible the round ligament through abdominal wall, beginning at the fascia, close to its insertion in the pubis, following the canal to the internal ring.

After performing 150 operations they claim the DuBose method does not disturb the normal anatomy of the pelvic organs. It restores the uterus to a position of slight anteversion. Neither fixes the uterus nor interferes with the normal range of mobility. Does not interfere with fecundity or parturition. Takes the stress off of the attenuated round ligaments, and allows them to regain their tonicity. Is as nearly as possible an anatomic reconstruction in that it amounts to a temporary supplementary round ligament. No raw surfaces resulting from the technic, hence adhesions do not occur. The area of suspension is equal to the area of support, hence the point of support is not concentrated but uniformly distributed, and no reflex, nervous irritation results from it, as where there is concentration of suspension or support in any one peritoneal area. Is a preventive for recurrent abortion, due to retroverted uterus. Is used in retroversion and in the milder cases of prolapsus with good results.

Prolapse

Chronic Pelvic Pain. The most frequent cause of this, so A. Alcock[3] states is descent of the pelvic organs, and the resultant dragging on the peritoneal attach-

(2) Southern Med. Jour., September, 1926.
(3) British Med. Jour., April 3, 1926.

ments and fascial supports. The perineum has been expressively termed "the inferior abdominal wall," and certainly what we understand as prolapse is a hernial protrusion through this structure; and he believes that the weakening of the muscular and fascial layers which constitute it is the first principle in prolapse. If the wall is torn or lacks tone, only a slight increase of intra-abdominal tension is necessary to bring about a hernial protrusion. The so-called "ligaments" of the uterus are not made to withstand any tensile stress. The structures responsible for support of the uterus are therefore (1) the Levator ani and (2) the pelvic fascia. It must be remembered that prolapse can occur in nulliparæ and virgins, in which case an elongated cervix is almost invariably the cause. As in hernia, so there are degrees of prolapse; there may only be a slight bulging of the anterior vaginal wall with slight descent of the cervix, or the os may descend to the vaginal orifice; or, as a final stage, the uterus may be protruded completely from vagina. A small degree of prolapse, as a rule, gives more pain than a procidentia.

If the uterus has not involuted completely, a course of ergot and strychnin will be beneficial. Treatment on these lines is advised for a month, and if the prolapse is still present the condition must be regarded as hernia, and a truss in the form of a pessary is necessary. There is no question as to the relief so obtained. If a pessary or a truss gives relief and is comfortable Alcock sees no harm in its use. He uses only soft rubber pessaries, and many patients complain of pelvic pain immediately they cease to wear them. They must, of course, be changed and cleaned regularly. Many patients, however, are not relieved by a ring pessary—either it cannot be retained, or fails to give relief; then operative treatment is essential.

Alcock does one operation for prolapse only, "the operation for the radical cure of perineal hernia." In the last eight years has practised Fothergill's operation,

with certain modifications, without a failure. Among others, has operated on cases of procidentia which had previously undergone some form of ventrofixation with subsequent recurrence, and obtained a complete cure. The chief points are: (1) careful preoperative preparation, (2) amputation of cervix, (3) restoring the muscular and fascial supports under bladder, (4) restoring the muscular and fascial layers in front of rectum, and (5) building up a new perineal body.

[He should add that the cervix must be held backward to prevent recurrence.—Ed.]

"Hanger" Method for Procidentia. The operation described by G. W. Crile[4] was first used by him some 22 years ago. As it necessitates a partial hysterectomy, is

Fig. 27. "Hanger" method for procidentia (Crile). (*Left*) Bridge for suspension.
Fig. 28. (*Right*) Same, wedge for excision.

obviously not adapted within the child-bearing period. Low incision to right of midline. A wedge-shaped section of central part of uterus, apex down to cervix is removed, leaving a lateral strip of uterus free of mucosa on each side, with the attachments of round, broad, anterior and uterosacral ligaments. Bleeding controlled

(4) Annals of Surg., September, 1925.

and raw surface of each side and across cervix covered by suturing. The bladder, rectum, cervix and vagina involved in descensus may be raised or lowered by these 2 handles, and it remains only to find an anchorage. To this end a short incision made through fasciæ, muscle and peritoneum, parallel to original incision, but just to left of midline as in a Gilliam operation, this opening, however, being made just large enough to draw through it the left "handle" of descensus complex; the right handle is brought up through the primary incision. Thus

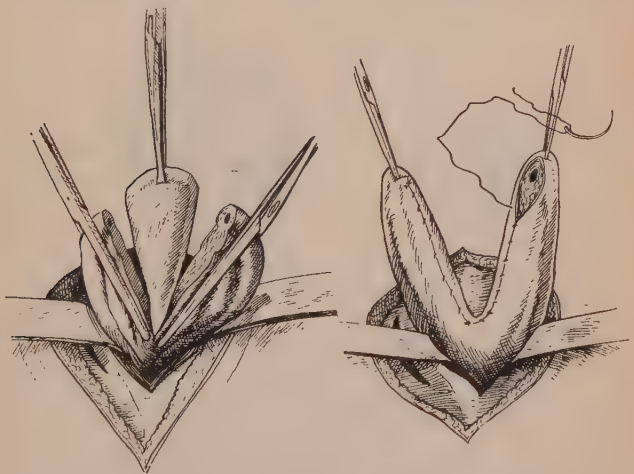


Fig. 29. (*Left*) Same, a wedge of uterus is taken out.
Fig. 30. (*Right*) The cervical canal is closed (Crile).

the two "strap handles" emerge well up and out of the right and left incisions with a substantial and dependable strip of abdominal wall lying between them. The two handles are crossed over this strip as if to grasp it and are sutured there, thus forming a permanent immovable opponent to further descensus.

It is obvious that the condition which makes this operation possible is the one sure indication for its perform-

ance. Unstretched ligaments can not reach the abdominal wall but unstretched ligaments in turn are still capable of performing their essential suspending functions. It is the stretched tissues in which the elasticity has been exhausted by constant strain that on the one hand indicate the need for the operation, and on the other, permit the maneuvre to be accomplished. As to the relief of the condition, it is obvious there can be no recurrence of procidentia as such. In extreme cases, however, there has been a partial cystocele and rectocele. For a short time after operation the patient will in-

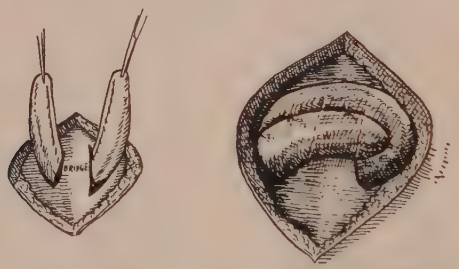


Fig. 31. Same, operation completed (Crile).

evitably feel a tugging upon the abdominal wall. This discomfort, however, is of limited duration and it deserves but slight consideration in contrast to the diminished probability of a return of the prolapsus. It should be borne in mind also in estimating the value of the procedure that procidentia is most prone to occur after the child-bearing period in multiparous women in whom the entire generative apparatus is already stretched and weakened beyond the possibility of permanent restoration by other maneuvres.

[This operation has a limited application in procidentia in old women—but plastics must also be done on the anterior and posterior vaginal wall.—Ed.]

Vaginal Operations for Prolapse. Examples of genital prolapse are classified as follows by W. E. Fothergill[5]:

(5) British Med. Jour., Feb. 13, 1926.

1. *Cystocele,* anterior vaginal wall with urethra and part of bladder bulging in vulva, uterus in usual position. 2. *True prolapse,* anterior wall, urethra and bladder descend, followed by cervix, and last by posterior wall. 3. *Long cervix* with loose uterus, cervix emerges first at vulva, followed by vaginal walls, inverted from above down, round descending uterus. 4. *Rectocele,* the posterior vaginal wall and anterior rectal descend together and bulge in vulva. The 3 combinations are *(a)* rectocele and cystocele; *(b)* rectocele and true prolapse; and *(c)* rectocele and long cervix. Nearly all admissions fall into one or other of these 7 categories. It may be taken for granted that in nearly all the perineum has either been torn or stretched by the descending structures.

The history is reviewed from 1831 to the present. Why—he asks—did plastic vaginal operations succeed in some hands and some cases while they still failed to most surgeons? The objects of narrowing the vagina, shortening the uterus, and restoring the integrity of the perineum were generally attained. Why did the prolapse so frequently recur? Such questions were only answered by experience and anatomic research as to the normal supports of the pelvic viscera. The rationale of prolapse and its treatment was only explained when it was realized that the uterus, vagina, and bladder are not so much suspended from above or propped up from below as they are attached by their sides, where they receive their blood supply, and held in their normal position by the subperitoneal tissue which intervenes between the organs and the more fixed lateral structures in the pelvic floor. But with this information we can see how vaginal operations work, for the removal of a wide portion of the vaginal wall exposes the lateral tissue or paracolpos. When the wound is sutured, unstriped muscle and connective tissue that formerly lay far apart at the sides of the vagina are brought together in the mid-plane of pelvis. This lengthens the course of the structures and so tightens them up, thus restoring

efficiency to the attachments of the vagina and bladder. Again, high amputation of the cervix exposes the parametrium and allows its right and left portions to be brought together in the midline in front of the stump of cervix. *I. e.*, anterior colporrhaphy works not so much by narrowing the vagina as by exposing the paracolpos; and amputation of cervix works not so much by shortening uterus as by freely exposing the parametrium. In this light it is clear that those who gained success when these operations were still empirical must have operated so as to secure good union of lateral tissues in the mid-plane of pelvis.

[Careful dissection of the planes of pelvic fascia, and the repair of recent obstetric traumas, train a man to succeed in prolapse work. Fothergill was an artist.—Ed.]

How could these operations be simplified and standardized so as to place uniform success within the grasp of any competent surgeon? At the Edinburgh Obstetrical Society in 1907 Fothergill advocated the extension of the anterior colporrhaphy wound far into the lateral fornices with the object of securing better exposure of the paracolpos than is given by the ordinary colporrhaphy wound, together with exposure of the under surface of the parametrium. This modification was followed by improvement in his own results; but soon realized the importance of high amputation of the cervix to secure efficient exposure of the parametrium. In 1910 he began to excise a large portion of the anterior vaginal wall together with the cervix in one piece. The incision begins half an inch above the urethral orifice, passes wide of cervix on either side, and ends behind it. This leaves a quadrilateral wound narrow below, wide above, with the stump of cervix near its posterior angle. The bladder, freely separated from the cervix, is well out of the way. The parametrium is much better exposed than when the amputation and the colporrhaphy are done one after the other. Beginning in the midline behind, the

vaginal wall is sutured to the cut edge of cervical canal until the stump of the cervix is covered in. The rest of wound is closed from side to side by interrupted sutures which take a good bite of the paracolpos together with the edge of vaginal wall. As this is done the cervix passes up and back, and uterus is left in anteversion. This combination of anterior colporrhaphy and amputation of cervix in a single operation has proved during the last 15 years to be simple, safe, and efficient. It is generally followed by perineorrhaphy, colpoperineorrhapy being used whenever rectocele is present. It was found that 97% of the cases in 1914-15-16 were permanently cured. Thirty children had been born to 24 of the patients. One of them who had had 3 children required further operative treatment; this patient's cervix was not removed at the first operation, or the result might have been better.

[We have employed the Fothergill technique with considerable success—but every case of prolapse must be individualized.—Ed.]

Cure of Prolapse. R. S. Cron[6] observes that the interposition operation is successful because it uses fixed structures for support. The uterus acts as a shelf to hold the bladder and is elevated in the pelvis by being tipped forward, its position being changed 180°. The twist produced in the broad ligaments by the change in the position of the uterus, perceptibly shortens them, and is the chief factor in correcting the uterine prolapse, and finally as Miller has brought out, the tendencies of uterus and bladder are antagonistic to further prolapse as they work against each other to hold the correct position.

Conservation of Uterus in Prolapse. This is emphasized by B. Houston[7]: He believes operation when necessary in child-bearing period is practical. That properly-performed plastic in no way prevents against subsequent childbirth. That such patients will remain

(6) Wisconsin Med. Jour., July, 1926.
(7) Jour. Iowa State Med. Soc., June, 1926.

cured, as related to the cystocele and descensus. That the interposition operation has a routine place at menopause and later. That the uterus is the best possible support for retention of the protruding cystocele.

Prolapse Through Ring-Pessary, With Strangulation. The patient seen by H. A. Duncan[8] was aged 66, admitted for painful tumor protruding from vulva for 6 hours. This was rapidly increasing, and becoming darker and more painful. Menopause at 55. For decade had procidentia, and for nearly a year gravity ulcers over protruding uterus which bled freely. A month before admission family doctor replaced uterus and inserted a McIntosh stem-ring pessary, which gave good support. While lifting a heavy weight 6 hours prior felt uterus pass down through ring and escape from vulva. Repeated attempts were made by patient to replace the uterus or remove ring, but the mass increased rapidly.

On admission, a hurried general examination revealed nothing except a very obese abdomen, varicose veins, and healed varicose ulcers. An ovoid mass measuring 10 in. around at the internal os, and 10 in. around in what should have been the long axis of uterus protruded from vulva. The stem of a pessary could be seen pointing up toward urinary meatus, and ring could be felt encircling the dark mass. The ring of the pessary was cut, and pessary removed. No attempt was made to replace the uterus. The surrounding tissues were so indurated and friable, it was thought very likely that a slough would follow and might involve the base of bladder. Hot boric-acid compresses were applied. Each day the mass grew smaller and of better color. Finally the prolapsed uterus was reduced, although the vaginal walls were still greatly thickened, and a No. 2 Menge pessary was introduced. Two days later, when the uterus had almost regained normal size, and was kept in good position by Menge pessary. (Plate XXI.)

[An interesting accident.—Ed.]

(8) Atlantic Med. Jour., July, 1926.

End-Results. The paper by E. A. Bullard[9] is a comparative study of the end-results of the various operations for prolapse done 1915-25 at the Woman's Hospital. There were 361 cases and 30 different operators. Every patient had been examined by the surgeon who operated upon or by some other member of the staff at least once since operation, and a large majority have been observed several years in Follow-up Clinics. (It may be of casual interest to record that the major preoperative symptoms in this series were backache and dragging sensations in pelvis; 58% complained of the dragging sensations, and 54% of backache.)

I. Operations for Prolapse

Watkins	77
Bissell's Resection of Uterus	12
Mayo Vaginal Hysterectomy	50
Vaginal Hysterectomy	74
Vaginal Plastics Only	81
Vaginal and Abdominal Combined	56
Abdominal Only	7
Emmet-Baldwin	4

II. Degree of Prolapse by Decades

Age	1st Degree	2nd Degree	3rd Degree
20–30	9	7	4
30–40	45	54	13
40–50	47	51	27
50–60	26	31	23
60–70	6	10	8
Totals	133	153	75

Some 73 of the successful cases of this 361 were followed up less than six months, 30 others were observed from six months to one year, 74 others less than two years, giving a total of 177—about half of whole series. However, 72% of the failures or anatomic defects appeared within six months of the operation, and only 8% of the total defects in the entire series occurred later

(9) Amer. Jour. Obstet. and Gynecol., May, 1926.

than two years after operation. Failures of prolapse operations occur early.

The striking thing about this study is that about 95% are cured by plastic surgery. The vaginal plastic work combined with ligament shortenings from above is satisfactory perhaps in slight prolapse, but the careful fascial reconstruction by vagina undoubtedly is responsible for the success. Most gynecologists of today have ceased to attempt to cure descent of the uterus by any form of suspension or fixation by the abdominal route. Careful reconstruction of the various planes of the pelvic fascia that have become attenuated, overstretched, or torn is the *sine qua non* of the operative treatment.

In this series, the Watkins operation has not been followed by enterocele, but they had a considerable percentage with bladder symptoms. The Mayo operation has been extremely satisfactory except for an occasional enterocele. The vaginal hysterectomy by Bissell's technic has been most satisfactory, but unless perfectly done, and perhaps even then, may be followed by an occasional enterocele.

[An excellent study which shows what expert plastic surgeons can do in fascial reconstruction.—Ed.]

End-Results of Interposition Operation. The technic used by F. W. Johnson[1] is based on that of Watkins, but is modified by sewing the whole anterior surface of uterus down to cervix to the *fascia* of the anterior vaginal wall. Thus the uterus is *firmly fixed* in anteversion to the fascia and the bladder.

Seven years ago he tabulated the end-results of 68 interposition operations (1909-18); mortality *nil*. The oldest patient was 69, the youngest 21. Forty-six were between 50 and 60 years, while thirty were between 40 and 50. Almost all were from the laboring class and as soon as possible were obliged to return to their homes—just the class that would put any operation to its severest test. From 68 answers it appeared that 54 had been wholly

(1) Surg., Gynecol. and Obstet., April, 1926.

relieved. No other operation for prolapsus and cystocele, attended with almost no danger and no shock, gives as good end-results. It is one from which elderly and old women recover quickly.

Another series of 50 cases (1918-23) were operated on by modified method. Oldest again 69 years, youngest 30. Necessary to repair or amputate cervix in 41, and Crossen's or Bandler's operation for relaxed pelvic outlet and rectocele done in 45; no mortality. Letters were sent and the following questions were asked:

1. Did the operations relieve you of the troubles of which you complained?
2. Is there falling down of the parts?
3. To what extent has your general health been improved by the operations?

It appeared that 27 out of the 32 replies had been wholly relieved: there had been no falling down of the parts and there had been improvement in the general health. Two got partial relief. There was total failure in 3 (the cervix again presented at vulva). These were cases of enterocele which Johnson did not recognize at the time of operation, but had considered very large rectoceles. In the two series, there were 140 patients operated on, end-results were obtained in 100 cases, and 81 were wholly relieved.

The opening into peritoneal cavity anteriorly must be large enough so the uterus may be easily and well drawn through into the vagina so that the bladder will lie smoothly, not in folds, and the base be not elevated on the posterior surface of the fundus. For unless these precautions are taken the patient will complain of symptoms pointing to an irritable bladder. In almost all residual urine containing pus, epithelium and colon bacilli will be found, and cystoscopy will show a chronic trigonitis. This ought to be cured before operation, and it can easily be done in a few days by keeping the patient in bed, by thoroughly emptying the bladder with a catheter twice a day, irrigating bladder with a 4% solu-

tion of boric acid, and after thoroughly draining the bladder instilling into it 2 oz. of a 1:1000 solution of mercurochrome-220, soluble. For the following reason the bowels are not moved for 7 days: Even though the greatest care is exercised in giving an enema and in cleaning the anus after defecation the perineum becomes a little soiled and the sutures may thus become an easy prey to the microörganisms present. The kind of diet for the 7 days is such there is no accumulation of feces in rectum.

[End-results of interposition are always good in properly-selected cases.—Ed.]

Injuries

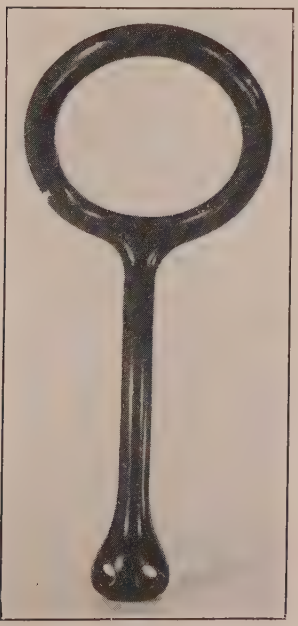
Perforation of Uterus by Foreign Body. A patient, of 40, supposing herself to be pregnant, inserted a catheter. Being unable to recover it, she visited her physician, who, employing manual methods, failed to find it. He referred patient to a surgeon, who anesthetized her, but was likewise unable to locate catheter. Pain developed in the region of the kidney, and she remained in bed for a week, her physician making a tentative diagnosis of renal or ureteral calculus. At this time was referred to H. L. Harris[2] for *x*-ray examination. No calculus but the embedded catheter was revealed as the cause of the trouble. The surgeon, upon removing it, could detect no opening through the uterus, but the omentum was wrapped around the upper end of catheter. (Plate XXII.)

[This accident happens quite frequently, and the *x*-ray locates the point of arrest.—Ed.]

Hematoma in Sheath of Rectus. The gynecologic significance of this when taking place spontaneously is considered by C. Culbertson[3] based on a personal case,

(2) Radiology, November, 1925.
(3) Jour. Amer. Med. Ass'n., Dec. 19, 1925.

Uterus prolapsed through ring-pessary.



Two views of pessary through which prolapse occurred.—Duncan, page 426.

PLATE XXII.

Perforation of uterus by foreign body.—Harris, page 430.

PLATE XXIII.

Sketch made at operation. Note three complete turns in ampullar part of tube. Fimbriæ tremendously swollen but not adherent. (The small cystic mass attached to tubal mass is a hydatid cyst involved in the torsion.)—Darner, page 435.

and 29 collected ones: Thirteen over 50; seven 40 to 50; seven under 40 (three not stated). Coughing due to bronchitis or influenza was given as the immediate causal factor in 11, ordinary bodily movements in 5, and unusual muscular exertion, in the form of hard work, in 6. No apparent cause (muscular effort) was seen in three and in two others there was a struggle to keep the balance in falling. Vomiting preceded the rupture in one, and in only one was participation in athletic exercise the factor. Arteriosclerosis was a known condition in one, heart disease had been present in two, and hemiplegia had occurred sometime previously in one other. Obesity was emphasized in 9 reports, but in 19 the constitutional build was not stated. One patient was not obese. Fifteen patients had had children, most of them, several. In 13 parity is not mentioned; one only was a nullipara.

One of the outstanding features is that of diagnosis, in most cases the true condition not being recognized prior to operation. In 6 the diagnosis was appendicitis; in 7, ovarian cyst with twisted pedicle; in two, appendicitis or ovarian cyst; in two, ovarian tumor, and in two, gallbladder disease. In three the preoperative diagnosis was not stated. In one each the condition was thought to be mesenteric embolism, intraperitoneal disease, intestinal obstruction, abdominal hernia, desmoid tumor and ectopic pregnancy. In only three was rectus hematoma diagnosed, and in only two others was it suspected. The treatment is conservative, if hematoma is small. If the accumulation is large enough to require evacuation, has become infected or has ruptured into peritoneal cavity, intervention is indicated.

W. E. Fothergill[4] discusses these masses as *simulating pelvic new growths:* (I) Patient, of 57, was quite well until she had a day of severe pain. Her physician found a considerable swelling rising above pubes on right side. The pain subsided; but, two days later, diffuse black

(4) British Med. Jour., June 5, 1926.

bruises appeared upon the surface. When Fothergill saw her during the following week there was a discolored area, about 8x4 in., containing many patches of subcutaneous hemorrhage. The rounded swelling resembled a 4½ months' pregnant uterus in shape and size, but more like a fibroid in consistency. The cervix was pushed forward by a cystic swelling, which could be felt in the pouch of Douglas. But when patient was asked to sit up, and so brought the recti into contraction, the swelling above pubes could still be felt, and became quite fixed. This showed it was really in abdominal wall. The abdomen was opened through blood-stained tissues. A simple cyst of left ovary was then removed. The hematoma lay within right rectus, with thick muscle over it. The mass of clot projected into the abdominal cavity, with a thin layer of muscle and the peritoneum under it. The clot was turned out through a cut in edge of muscle.

(II) Another practitioner had diagnosed "ovarian tumor." The patient was a stout, healthy woman, past the menopause, and said the pain and swelling dated from a fall over a clothes-basket, which hurt her very much, but did not prevent her from finishing her washing. The right lower abdomen was quite dull and solid, as if iliac fossa was filled by a mass which rose above the umbilicus and crossed the midline. The mass could still be felt, and became fixed when the patient sat up, and this sign, with the history of the fall, gave the diagnosis of hematoma. Expectant treatment was employed. Later there was some constitutional disturbance, and the mass became softer. When seen again the signs were those of a large cyst adherent to the abdominal wall, and it was clear the clot had become infected and liquefied. An incision liberated a great quantity of chocolate-colored pus mixed with clot which had been distending a cavity walled in front by the rectus and separated from abdomen by peritoneum below and by peritoneum and the sheath of rectus above.

[The sudden appearance and extreme sensitiveness together with the fact that the mass is in the abdominal wall points to the diagnosis.—Ed.]

Torsion of Normal Tube. While this condition seems uncommon, two instances were cited in the 1925 volume (those of Michael and of Rogers). Several more have been placed on record since. The first by R. M. Allan[5] in a multipara, of 35, who was admitted with an acute abdominal crisis. Complaint of intense pain with vomiting, coming on suddenly after heavy lifting; located low down in abdomen on left side, radiating into thigh. No arrest of feces, nor urinary disturbances. The last menstrual epoch (3 weeks prior) was normal. Palpation disclosed uterus normal, soft mass in left culdesac. At laparotomy external half of left tube found completely twisted twice, from left to right, forming mass size of a golf ball. The rest of tube and the ovary normal, as were adnexa of opposite side; mesosalpinx on each side abnormally long; no effusion in peritoneum. Examination of the specimen showed hematosalpinx but no trace of ectopic pregnancy. Hence there was torsion of a normal tube, which is rarer than twist of a diseased tube or of an ovarian cyst. As a rule, the condition as in present case usually comes on at a time when menstrual flow is expected. When located on right side, often confused with appendicitis.

[Exceptional, unless there is a Morgagni cyst at the free end.—Ed.]

J. C. Jefferson[6] met with *another instance:* Patient, of 32, admitted for "acute appendicitis." She stated severe pain had commenced in the early morning of the same day and she had vomited continuously since. Her periods had always been irregular, the last 9 weeks previously. The pain was referred to right fossa and back of right buttock in the area of 1st lumbar nerve. There was some rigidity over right fossa. Cutaneous

(5) Med. Jour. Australia, October, 1925.
(6) British Med. Jour., Jan. 9, 1926.

hyperesthesia very definitely present just above center of Poupart's ligament and to a lesser degree over the area behind previously referred to. On rectal examination a tender swelling was felt to the right of the uterus. T. subnormal and P. 100. A tubal lesion was diagnosed, and right tube found twisted, together with an abnormally long mesosalpinx, in a clockwise direction, and to be swollen, and intensely congested. The tube was untwisted with the greatest readiness and there were no adhesions; it was removed, and patient began to menstruate 2 days after operation.

There were thus present the requisite factors which precipitate this occurrence—a long mesosalpinx and the circulatory disturbances caused by premenstrual hyperemia. The striking point about the symptoms, to his mind, was the very definite area of pain and cutaneous hyperesthesia over the right buttock in the area supplied by 1st lumbar nerve. The afferent fibres of the tube appear to belong to the 11th and 12th thoracic and 1st lumbar nerves. In this case, at any rate, its innervation must have been definitely from the latter segment, as the thoracic were not affected. In 27 cases of ectopic gestation leading to either rupture of tube or tubal abortion, lesions somewhat comparable in severity, Jefferson has not observed this sign before.

The patient alluded to by M. Auvray[7] was 17 years old, acute pain in right fossa with vomiting a few times. By rectal touch mass detected in appendicular region. At operation some adhesions met with about ovary, the tube was twisted once, examination showed tube normal. Auvray added most of the cases published had been mistaken for appendicitis, not surprising for the symptoms were the same and in the same region. The cause of the torsion is still obscure, in spite of many hypotheses.

J. L. Faure in the discussion said he had had several cases, and was amazed it did not happen much more

(7) Gaz. des Hôpitaux, March 31, 1926.

often, why should not the tube twist the same as any other organ?

Still another one is described by H. L. Darner[8]: A girl, of 13, was admitted Jan. 1. Catamenia began previous November, normal flow for 3 days, complete amenorrhea since. Five days prior had been kicked and at once complained of colicky pain in entire lower abdomen. Some relief by hot applications, but dull ache kept up. Some nausea but no vomiting, appetite fairly good. Bowels regular and active catharsis at onset did not intensify symptoms. In bed from onset. T. 100.6°; P. 92; R. 20. Much tenderness in lower quadrant. No muscle spasm or rigidity, no acute tenderness at McBurney's point; Rovsing's sign negative. On rectal examination a tender, indefinite putty-like mass found high in right fornix.

The impression was acute appendiceal abscess. Another rectal examination under ether showed mass in fornix was fairly-movable, sausage-shaped and about 3 in. wide. It was felt to be some lesion of right adnexa of uncertain nature.

On opening abdomen 300 c.c. of blood-tinged fluid in abdomen, appendix absolutely normal. The distal third of right tube was tremendously distended, bluish black and fimbriæ markedly swollen and cyanotic. There were no abnormally long accessory ostia. Attached to tubal mass was a small hydatid cyst also extremely cyanotic. The medial and proximal third of tube had been twisted clockwise 3½ times. The ovary found beneath tubal mass was perfectly normal, and pedicle had not been distorted. The infundibulopelvic ligament was not elongated or distorted, and no varices in either broad ligament region. The left adnexa and uterus normal. No recently-ruptured follicles were noted in either ovary. The tube was removed, ligament drawn over cornu, appendectomy. On 5th day normal menstrual period. At time of report (year later) menstruation

(8) Amer. Jour. Obstet. and Gynecol., March, 1926.

normal. Microscopic examination showed usual changes with torsion; appendix normal. (Plate XXIII.)

[These cases show what must be kept in mind in making a differential diagnosis.—Ed.]

Torsion of a Fibromatous Uterus occurred in a patient, of 25, under the observation of M. Pouliquen[9]: It was of the hemorrhagic type, and had produced marked anemia. The mass extended to umbilicus, edema of right leg set up, soon followed by phlebitis, then latter involved other leg. T. rose to 100.4 and 102.2. Condition grew worse, with retention of urine; never any complaint of acute pain. At operation a fibroma was found pointing to right iliac fossa, the left adnexa were on right side, and reciprocally. Recovery after detorsion and subototal hysterectomy.

Urethral Hernia of Bladder. This unusual condition occurred in a patient, aged 15, under the observation of St. J. W. Dansey[1]: She complained of dull pain in left lumbar region of a year's duration. Urinary frequency was associated with pain and occasionally the urinary flow stopped abruptly. The patient noticed for some time that on straining after the passage of urine a lump appeared in front passage; remained for a varying time and then disappeared. Tenderness over left kidney and ureter. Occasionally after she strained or coughed a red pyriform swelling, about the size of a hen's egg, was noticed protruding from urethral orifice. This was covered with congested mucosa and bled easily on palpation. The protrusion was readily reduced and left a greatly dilated, but normal urethra. *X*-ray revealed a definite shadow, about ⅝ in. wide along the left ureteral line.

Under ether the urethra readily permitted free digital exploration and a soft mass was discovered lying in the base of bladder. The bladder was opened and the mass proved to be a protrusion of the wall near left ureteral opening. This was 2½ in. long and 2¼ in. wide. After

(9) Gaz. des Hôpitaux, June 23, 1926.
(1) Med. Jour. Australia, Aug. 1, 1925.

incision the finger entered the greatly-dilated left ureter and a stone was felt high up. The calculus was removed and the walls of sac cut away. A week later a cystoscopic examination revealed ureteral opening well contracted with a ring of healing granulation tissue. A catheter was passed into the pelvis of kidney and left *in situ*. During the following fourteen hours, 200 oz. of urine were passed through the catheter. A pyelogram was obtained after the injection of KI. solution through the catheter and the pelvis proved to be normal.

Dansey takes it that the course of events leading to the condition was first the passage of the stone from the kidney a year previously or the gradual formation *in situ* in ureter. This calculus passed down to the ureteral opening and there caused an intermittent blocking. The blocking in its turn produced a gradually-increasing protrusion of the ureteral orifice with the bladder wall and large dilation of the ureter. The protrusion ultimately reached such a size that when patient strained it was able to pass a toneless *sphincter vesicæ* and become at times a hernial protrusion. That the calculus acted intermittently as a ball valve is shown by the fact there was no demonstratable hydronephrosis and kidney was secreting urine in a normal manner. Although the ureteral orifice must be frequently blocked in a similar way by a calculus no such protrusion of bladder wall occurs.

Hernia of Ovaries and Tubes. The girl-baby, of 81 days, under the care of W. N. Rowley[2] at birth had small mass in right inguinal region not reducible, but gave no apparent symptoms till 2 days before operation. Then mother noted mass had grown the size of a small hen's egg. It was acutely tender, with moderate edema of skin. Attempts to reduce contents failed and after using warm applications for twelve hours child was better. On incision into sac, considerable fluid found. The right and left ovary and tube filled the sac. The left

(2) Amer. Jour. Obstet. and Gynecol., November, 1925.

ovary was 3.5 cm. in diameter on its long axis and 2 cm. transverse diameter. The left tube was 6 cm. long, 0.5 cm. in diameter, edematous and reddened from a passive congestion. The right ovary was 2 cm. long and 1.75 cm. transverse diameter, and contained a small cyst 0.5 cm. in diameter. The right tube showed the same condition as the left. The fundus of uterus was drawn down into canal and did not occupy the sac. No intestinal content in the sac, nor any omentum.

The diameter of the internal ring was 1.25 cm. It was necessary to puncture the cysts in both ovaries and to incise the ring to replace the contents of sac into abdominal cavity. The round ligament of the right side was congested and that of the left side was apparently over-stretched. The sac was closed by a pursestring close to the internal ring and amputated. The canal was then obliterated by modification of the Bassini technic without transplantation of round ligament. At time of report (90 days postoperative) no recurrence of the symptoms nor any appearance of failure of the repair. There is a slight relaxation of the inguinal ring on the left side.

The interesting features are: The presence of left ovary and tube in a right hernial sac. The cystic degeneration and edema of ovary, which made the size unusual. Absence of intestine in the hernia, and of any abnormalities in development of genitalia.

Ovarian Hernia in Nurslings. Reference is made by H. L. Rocher[3] to 4 operations by himself, and 4 more by his associate, on nurslings of 3 to 7 months. This anomaly is generally overlooked, and mistaken for a cyst in the canal of Nuck, or for strangulated hernia. It manifests itself as a small, oval, pediculated mass, movable in front of inguinal canal. Occasional reducible, but not as a rule, in many instances the tube as well escapes, and torsion of the pedicle may take place. If the twist is marked and of some days' standing, the

(3) Jour. de Méd. de Bordeaux, Nov. 10, 1925.

anatomic and functional integrity of the ovary may be compromised. Hence, in presence of a nursling a few months old with mass as described, the possibility of a hernia must be borne in mind, and operation undertaken. For, even if not strangulated, the ovary may undergo changes, become polycystic, and at any moment volvulus may ensue. Operation, of course, is all the more imperative if there be signs of strangulation, or of volvulus. In the absence of strangulation it is evident extreme conservatism is indicated, and efforts limited to replacing the ovary and tube in abdomen, which—by the way—is not always easy. On the other hand, should there be strangulation or volvulus, the ovary completely violet-colored, apoplectic, there need be no hesitation about castration, for the gland invaded by hemorrhagic infarcts has nearly inevitably lost its functional value. In case of an ovary with many small cysts, equal conservatism is in place, it will suffice if the small cysts visible on surface be opened with point of knife, then ovary and tube replaced in abdomen. The etiology is easily explained by a congenital anomaly of the broad ligament, the tubal extremity and external portion always being fixed at the internal ring; also by a persistent canal of Nuck, and situation of ovary high up behind the vaginoperitoneal canal.

Hernia in Broad Ligament. What is believed to be the 4th example is placed on record by L. Dunn[4]: Patient, aged 44, seen Jan. 30, 1919. In 1904, fell off chair landing on feet, jarred so that miscarriage occurred 3 days later. For a year had much pain in abdomen. Since then could not lie on left side except when pregnant without causing intense pain which, if position was not changed would extend over whole lower abdomen. Dyspareunia for past 4 years. Four labors and 2 miscarriages since accident. Neither dulness nor tenderness of abdomen. Uterus in normal position. Neither tumor nor induration found to the right or posteriorly. How-

(4) Surg., Gynecol. and Obstet., March, 1926.

ever, there was an indefinable sense of resistance to left. This was not particularly tender but a dull ache followed the examination.

On Feb. 1, the hand encountered a mass of small intestine fixed in left pelvis. Good exposure disclosed 15 in. of intestine projecting through an opening in mesosalpinx. This opening was approximately 2 in. wide and of sufficient size readily to permit the withdrawal of intestine. It was limited anteriorly by tube and posteriorly, and to the inner side, by the attenuated utero-ovarian ligament and ovary, closed with chromic catgut. The needle was passed very close to the edge of opening,

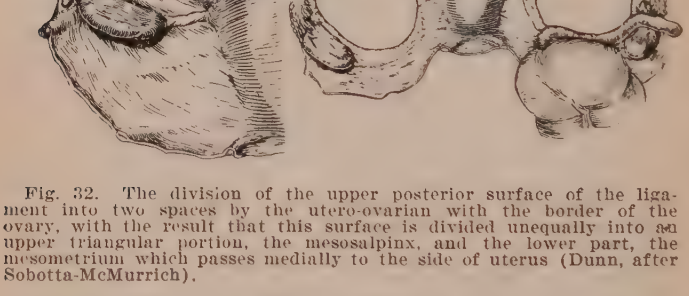


Fig. 32. The division of the upper posterior surface of the ligament into two spaces by the utero-ovarian with the border of the ovary, with the result that this surface is divided unequally into an upper triangular portion, the mesosalpinx, and the lower part, the mesometrium which passes medially to the side of uterus (Dunn, after Sobotta-McMurrich).

Fig. 33. Each broad ligament presented a window 5 cm. wide, limited anteriorly by the tube and posteriorly by the attenuated utero-ovarian ligament and ovary. The proximal end of appendix extended parallel with and was attached to posterior edge of the window of right broad ligament, the distal end pointing to right (Dunn).

which drew the tube to the side of uterus. Further examination located a similar opening of same size in right broad ligament. This lay between the tube and utero-ovarian ligament. No intestine occupied this opening, but the proximal end of appendix was attached to the posterior edge of hernial opening, the end pointing to right. It was removed and the opening obliterated as on left side. A survey was made and since it was found that left tube

had become cyanotic from impairment of its blood supply it was removed. The right tube was examined again and its circulation seemed unimpaired.

The patient returning home at the end of 2 weeks. However, on the way from hospital, developed an intense pain in right iliac region. This pain, with an elevated temperature, continued for a week. A vaginal opening was then made into right broad ligament at the point of induration and tenderness. This released a considerable quantity of serous exudate but no pus. The patient has been well since. This was doubtless due to interference with the blood supply of the right tube. It is an interesting speculation as to the time the intestine had occupied the opening in broad ligament. It is conceivable that with the fluid content of the small intestine, such a condition was possible without obstruction occurring during the years she suffered following injury. The fact she was comfortable when pregnant and has been completely relieved since the operative obliteration of these stomata, supports the inference that the intestine probably occupied the ostia in the broad ligament the greater part of this time, for when on left side she always had pain.

Posterior Vaginal Hernia. L. M. Miles[5] records 2 examples of the posterior type in Chinese patients, of 36, and 46, respectively. The literature has been studied, and 9 cases which appeared to be definitely of this order have been reviewed, with 2 additional cases by author. The cause is with one exception found to be pregnancy or childbearing. A new classification embracing all herniæ through pelvic floor is offered, and classifying it according to its course thus: Pelvic hernia may be perineal, pudendal, or vaginal; and vaginal pelvic hernia may be (*a*) anterior, or (*b*) posterior. Prolapse of uterus accompanied by a general enlargement of the cul-de-sac and protrusion of abdominal contents into vaginal vault.

(5) Surg., Gynecol. and Obstet., April, 1926.

should be called either elytrocele or vaginal enterocele, and not a hernia.

Of the 6 operative cases reported, 3 were done entirely through the perineal route, 2 by abdominal route only, and 1 by combined perineal and abdominal routes. Only 1 case, (Hartmann) by perineal route, has been followed up for a long period and apparently resulted in a cure. It would seem the best results are to be obtained by a combination of abdominal and perineal operation. The sac should be dissected up to the level of the cervix and its

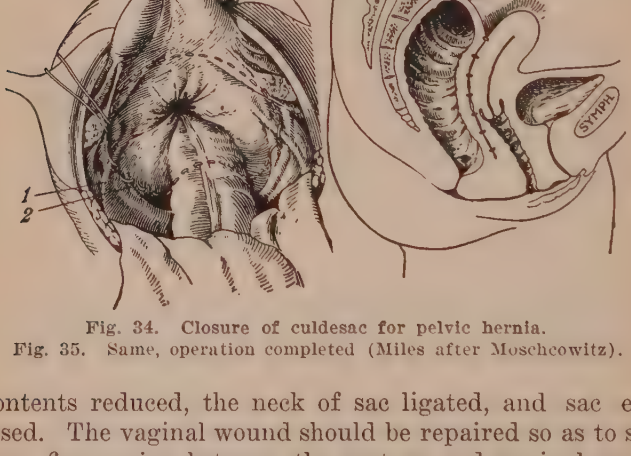


Fig. 34. Closure of culdesac for pelvic hernia.
Fig. 35. Same, operation completed (Miles after Moschcowitz).

contents reduced, the neck of sac ligated, and sac excised. The vaginal wound should be repaired so as to secure firm union between the rectum and vaginal wall, and the perineum repaired. Then, if possible, the abdomen should be opened, in Trendelenburg position, and the cul-de-sac obliterated according to Moschcowitz passing through the peritoneum and outer muscular coats of the rectum and vagina pursestring sutures of linen or silk, and closing the cul-de-sac from below up high on cervix.

[Case-reports, such as these, make up medical literature of value to the clinician.—Ed.]

Chronic Pelvic Infections. Some deductions from clinical as well as laboratory experience are presented by A. H. Curtis[6]: *Chronic Leucorrhea:* This arises chiefly from the cervix and from granular pockets about the urethra. It has also been found 30% of patients with chronic purulent leucorrhea are carriers of virulent streptococci. This means that about one in three with chronic discharge is liable to spontaneous postpartum infection, especially if there have been lacerations of the cervix. Also vaginal operations are accompanied by more than the usual risk of infection.

The Endometrium: Microscopic and bacteriologic studies indicate that chronic infection is quite unusual. Supravaginal removal of the chronically diseased uterus is a clean procedure, and treatment of the stump with iodin or cautery ordinarily superfluous. Similar studies of the endometrium from uteri removed a few days following curettage or packing, proved that many of these showed bacteriologic and histologic evidence of infection. Extensive intrauterine instrumentation introduces the possibility of a temporary acute endometritis. This is supported by clinical experience, after hysterectomy in these cases and after criminal abortion. Here it is found that the clean uterus may be entered with impunity, but a second invasion stirs up the bacteria previously introduced and results in active infection. High morbidity or mortality after abortion is almost pathognomonic of repeated invasion of the uterus or accidental perforation.

The Tubes: The gonococcus attacks the tube from within, while the streptococcus infection is only a part of widespread pelvic infection. (*a*) Gonorrheal Infections: Microscopic and bacteriologic studies of the tubes indicate that the tissues are usually sterile two weeks after fever and leucocytosis have subsided. It is consid-

(6) Surg., Gynecol. and Obstet., January, 1926.

ered that recurrence of salpingitis may represent a new infection from without or ascending infection from trauma of a chronically infected cervix. (*b.*) Streptococcus Infection: Similar studies indicate that bacteria persist in the tissues for a much longer period (6 to 24 months). Surgery is done only for complications or sequelæ and should be postponed for at least 6 months to allow infection to subside. A more radical attitude is taken towards the ovaries because there is considerable danger of reinfection.

Conclusions: 1. Operation by the vaginal route upon patients with chronic purulent leucorrhea introduces an increased risk of postoperative streptococcic pelvic peritonitis. 2. The endometrium of the body of uterus is nearly always free from bacteria. Supravaginal hysterectomy is, therefore, ordinarily a clean procedure. 3. Mild infection of the endometrium is relatively frequent after diagnostic curettage. Hysterectomy should preferably be performed at the time of curettage or postponed until the subsidence of the inflammatory reaction. 4. Operations upon tubes for eradication of gonorrheal infection are not often indicated, because the infection tends to disappear if the patient is protected from reinfection. Surgery should be delayed and reserved chiefly for sequelæ, *e.g.*, adhesions, menstrual disturbance, and sterility.

[Evaluation of the history of the infection should always be considered, for the gonococcus usually travels on mucous membranes. The point made in the conclusions covers the accepted principles which guide our surgery in chronic infections.—Ed.]

The Bell-Beuttner Operation With Ovarian Conservation or Grafting. W. Blair Bell[7] points out that the inflammatory lesions for which this method is indicated are those which cause irreparable damage of the tubes, and possibly ovaries, and affect the fundus uteri, but less severely. Such lesions are chiefly produced by the

(7) Surg., Gynecol. and Obstet., January, 1926.

gonococcus. Streptococcus is usually less destructive. It is an essential condition that the infection be in the chronic stage at the time of operation. In gonorrheal cases it is often advisable to amputate or treat the cervix, in which the gonococcus finds an ideal habitation, before proceeding with the major operation; and this is especially necessary when that structure has been lacerated by childbirth.

Lesions of the fundus due to infection cause menorrhagia. The other symptoms are those of chronic salpingitis, ill-health, abdominal pain, dysmenorrhea, etc. In the absence of menorrhagia the fundus is rarely involved, and simple salpingectomy including the interstitial portion is sufficient. In more severe cases, or in those approaching the menopause, hysterectomy with removal of the adnexa is advisable. The operation in question then is reserved for a limited group of cases with irreparable lesions of the tubes and ovaries and definite infection of the fundus. Bell does not leave the ovary in the pelvis if there is any question concerning its blood supply. If the woman is under 40 ovarian graft is advised if both ovaries have been removed from their normal connections. The ligaments are tied before being divided, so operation is practically bloodless. If one ovary is to be conserved the corresponding tube is removed, leaving the mesosalpinx and ligating the bleeding vessels subsequently. On the anterior surface of uterus a flap of peritoneum with the bladder is reflected, and, after closing the uterus and controlling bleeding, this flap is sutured over on posterior surface covering all raw surface.

	Number	Per cen
Total number of cases	127	....
No after-history obtainable	39	....
Mortality	3	2.3
Operation too recently performed for result to be estimated	10	....
Number of cases considered	75	....
Successes		90

[In young women when a healthy ovary with its circulation can be conserved, the menstrual function should also be preserved. Our results with this operation are in accord with Bell's—there is no place for resection in the presence of infection.—Ed.]

Diagnosis and Treatment of Pelvic Infections. Concerning these, H. Schmitz[8] observes that the incidents of sexual life, as coitus, labor and puerperium, instrumental and operative procedures, are responsible for most infections of the female genital tract. The treatment of acute infections is symptomatic, expectant. Surgery is only then indicated in the acute state if the disease progresses from bad to worse, when early drainage must be instituted. Surgery is indicated in about 15% of the tubal infections. It should not be employed for the relief of the infection, but solely for the relief of the sequelæ, as adhesions, sterility, etc. In the light of recent researches, chronic endometritis should not be considered as a clinical entity. Curettage of the endometrium must be regarded as obsolete.

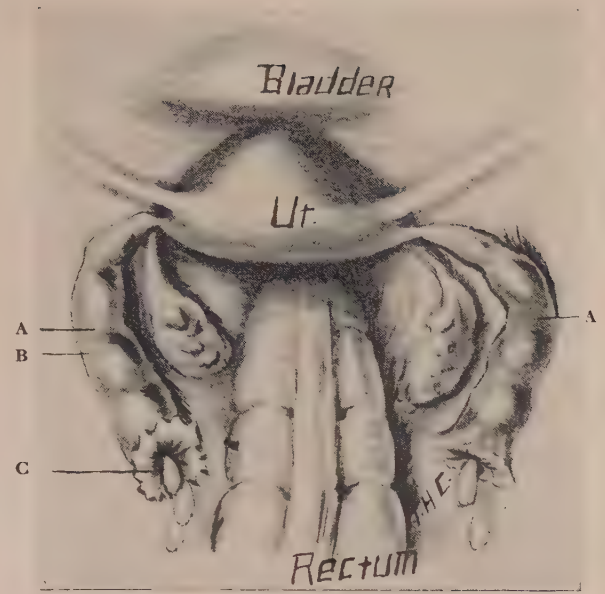
[The last statement should be emphasized.—Ed.]

Non-Surgical Treatment of Pelvic Inflammations. J. A. McGlinn[9] remarks that after a fairly-extensive experience of over 25 years his conclusions may be summed up as follows: 1. That except for evacuation and drainage surgery has no place in the acute stage of pelvic infection. 2. In the light of our present knowledge, operation should not be done in the subacute and chronic cases until Nature aided by treatments has had a chance to effect a cure. 3. Non-specific protein therapy is a most valuable addition.

[The Editor is encouraged to note that so many men are accepting conservatism and intelligent non-surgical therapy in infections.]

Treatment of Pelvic Infections. Analyzing 1105 cases, T. H. Cherry[1] states that during the previous 8

(8) Illinois Med. Jour., April, 1926.
(9) Therapeutic Gaz., April 15, 1926.
(1) Surg., Gynecol. and Obstet., May, 1926.

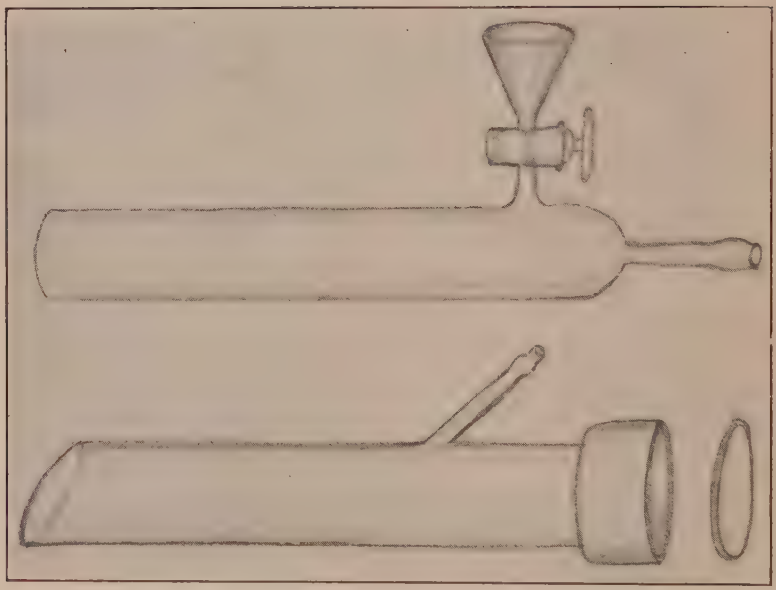


Showing an initial gonorrheal salpingitis. *A,A*, inflamed tubes; *B,B*, ovaries; *C,C*, fimbriated ends from which purulent material is exuding.

Complicated lesions following recurrent attacks of pelvic inflammation.—Cherry, page 446.

PLATE XXIV.

PLATE XXV.



Apparatus for passive hyperemia in chronic cervicitis.—Moench, page 454.

years, 40% of the admissions to the Gynecologic Division of the Harlem Hospital, (N. Y.) were for adnexal infection. In 88% the gonococcus was the cause. He believes that exclusively conservative treatment of adnexal disease is, on the whole, unsatisfactory. The patient upon discharge is inclined to ignore the advice given urging return visits, and reinfection often occurs. Injections of foreign protein (milk preparations and horse serum) have proved unsatisfactory. Diathermy as a conservative measure in disease of gonorrheal origin was the most successful of the palliative methods, as it caused a resolution of pelvic masses in 66.6% besides relieving pain in practically 100%. It also, by proper application of electrodes, controlled the infection of the lower genital tract. Initial acute attacks should not be treated surgically, as they spontaneously subside. Reinfection should not occur if the lower tract is properly treated. Recurrent attacks are excellent reasons for removal of the pelvic lesions. Such surgical procedures can be performed with a reasonable assurance of not over 3% operative mortality, if the temperature has remained normal for three to ten days and the leukocyte count is below 16,000. When in operative removal, pus contaminates the peritoneal cavity, the best results as to mortality and wound union are by closure of abdomen without drainage. If necessary the vaginal route is better than abdominal. (Plate XXIV.)

[When pelvic infections are treated by time and palliative measures the operative mortality can be reduced below Cherry's figures.—Ed.]

Operative Treatment of Inflammatory Pelvic Affections. In the previous decade, H. Keitler[2] has operated on 396 cases, 261 radical interventions, simple vaginal hysterectomy on but 3 occasions. In all the lesions completely immobilized the uterus and adnexa, there had been multiple irruptions of purulent foci into the neighboring cavities, continuous fever with progressive weak-

(2) Wiener klin. Woch., June 6, 1925.

ness necessitating speedy operation. With 3 exceptions noted the treatment consisted of free incision of the parauterine spaces, the infiltration in the walls of suppurating focus permitting correct and prolonged drainage. By this means cure was had in short time in all instances, the method being much less severe for patient, and no more difficult for operator than radical operations *via* abdomen or vagina. This method is indicated as well when in addition to the uterus, the rectum is immobilized and compressed by the pelvic infiltration, and which may give rise to severe complications.

[Local collections of pus should be drained. Most exudates resolve more rapidly when incised. Where to put this incision and drainage may necessitate exploration and inspection without manipulation.—Ed.]

Zinc Chlorid in Gynecology. This is simple, so Masson and Foucar[3] state, but should be undertaken with scrupulous care. There must be no excess of solution on the gauze, for uterine contractions may squeeze a few drops through the tubes into pelvic peritoneum or through the cervix into vagina. The gauze must not touch any part of the genitalia before it enters the uterus or a burn will result. This operation occupies a position intermediate between a simple curettage on the one hand and a surgical hysterectomy on the other. Its field is probably very limited and the indications are not many, but in a few carefully-selected cases, may be very valuable. The patients should be those who are passing through, or have passed the menopause, and are having abnormal bleeding or leucorrhea, not due to malignancy, for whom a hysterectomy hardly seems justified, and less radical methods would not give good results.

The chief disadvantage is the lack of any very accurate means of dosage. The complications which have been described by other authors are excessive erosion and sloughing; hemorrhage, sometimes alarming; stenosis of cervix with hydrometra, requiring intervention;

(3) Amer. Jour. Obstet. and Gynecol., September, 1925.

pelvic- and generalized peritonitis, sometimes ending fatally, and death due to toxic absorption. Most of these, however, occurred when the solution was injected directly into the uterus by a syringe, or when little was done to protect the vagina. The advantages of procedure are its simplicity and the endometrium can be destroyed without injury to the ovaries. A major operation can be avoided in certain borderline cases. Should

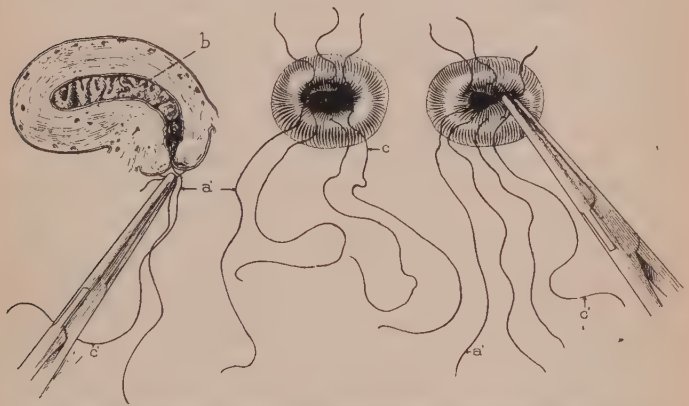


Fig. 36. Technic of chemical hysterectomy. (Masson-Foucar). Lateral view; fishline a′ protruding from cervix; tied to gauze b′.

Fig. 37. Front view, fishline c′ used for closing cervix.

Fig. 38. Cervix partly closed; method of holding lines with forceps.

this treatment prove unsatisfactory, hysterectomy can still be performed.

[The procedure has a limited field; a detailed technique must be observed, otherwise great injury is done. —Ed.]

Protein Therapy. In the series alluded to by J. Jarcho[4] injections of milk were made preferably in the gluteal region. The initial dose was 5 c.c., in very sick patients even less, and other injections followed every

(4) Med. Jour. and Record, Feb. 17, 1926.

3 to 5 days until all signs disappeared or until the localization and improvement indicated operation. In this series each patient required from 3 to 8 injections. In cases that ultimately require operation, preliminary injections localize the process, render operation easier and make the postoperative course not nearly so tempestuous. Most patients did not exhibit severe reactions, the leucocytosis being not excessive and course entirely undramatic. Hence severe reactions are not essential for cure. One must not forget fresh air, diet, or other supplementary methods.

Concerning *milk injections for pelvic infections*, G. Gellhorn[5] observes that nonspecific therapy of inflammatory diseases consists of the subcutaneous, intravenous or intramuscular injection of proteins in no wise related to the causative bacteria. Proteins thus introduced "parenterally", have the faculty of activating the protoplasm of all cells and, particularly, of those which are engaged in warfare against the invading microbes. This activation serves to mobilize the natural defensive powers and overcome the infection. Of the various substances recommended, milk is most easily available and at the same time highly efficacious. In gynecology, gonorrheal infection of tubes and Bartholin's glands is most often amenable; in other locations of the infection the therapeutic result is less conspicuous. Non-gonorrheal inflammations of the genital tract are also often cured by this treatment. In spite of its wide applicability, there are definite contraindications to protein therapy. It is still capable of further development.

[Should be used in all gonorrheal infections of the tubes during subacute stage. The results are sometimes dramatic.—Ed.]

A series of 100 pelvic inflammations were treated by milk injections by A. D. Campbell[6]: All with a minimum number, in conjunction with recognized local treat-

(5) New Orleans Med. and Surg. Jour., March, 1926.
(6) Canadian Med. Ass'n., Jour., April, 1926.

ment, *e.g.*, urethral instillations of argyrol 20%, picric acid 3%, applied to the cervix and cervical canal, daily douches, etc. The results were specially encouraging in acute or subacute types, either gonorrheal or non-gonorrheal, involving the lower genital tract. Chronic cases of either type, in spite of more prolonged treatment, did not respond nearly so well. The acute cases showed 55% of cures, with nine weeks of treatment, the chronic only 18%, in spite of twelve weeks' treatment.

With infections involving the higher portion of the tract, whether salpingitis or tubo-ovarian infection, with so-called "pelvic peritonitis," the results were about the same in each group, *i.e.*, 44% cures, 40% improved, 16% no change, except that tubal infections not involving the ovary required 12 weeks' treatment as against 9 where there was tubo-ovarian mass. In comparing the results in chronic types, gonorrheal or otherwise with acute or early infections, protein therapy was distinctly disappointing, there being cures in 20%, unimproved in over 40%, in spite of treatment for 3 to 4 months. The results were gratifying in that particularly difficult type showing post-partum pelvic lesions, laceration of cervix and infiltration of broad ligaments. Of these, 20% were cured and 19% improved in only six weeks. Such figures could probably have been improved on if some patients had returned more often. However, the fact they did not is presumptive evidence of their being sufficiently relieved to carry on their family duties.

[Protein injections *give the best results in bed patients* where physical rest permits the fullest activation of tissue resistance.—Ed.]

Treatment of Cervical Erosion. G. I. Strachan[7] points out that we have to treat and heal a chronic infective process which has penetrated to the deep glands or to the muscular tissue; and when this is done the secondary parametric infiltration will to a greater or lesser degree resolve itself. The main lines of treatment recommended

(7) British Med. Jour., Oct. 24, 1925.

are the application of antiseptics, cauterization or electric treatment, radium, vaccine therapy, and operative.

1. The antiseptics employed are usually 10% formalin, iodized phenol, or 20% argyrol. They are applied on mounted Playfair's probes after exposure of the cervix and removal of the glairy cervical mucus with Liquor potassæ. Assistance is necessary; the procedure has to be repeated two or three times weekly for several weeks; and the patient is apt to cease attending. Again, it is not to be expected that any surface application will penetrate to the deep glandular acini, far less into the muscular tissue, and the usual result of these applications is improvement during treatment with future relapse. Only in slight and early cases is cure to be expected. 2. Puncture with the actual cautery at a dull red causes improvement in many cases. It is important to puncture every Nabothian follicle with the cautery. Dickinson and others have elaborated radial cauterization of the cervix from external os. An electric cautery is used, and the process is repeated twice weekly for four or five weeks. Dickinson describes this as "office treatment," and reports a large percentage of cures. It is the usual experience to find improvement after cauterization, but cure is not common, and so far as Strachan can judge, even if successful the cervix is still left prone to carcinoma. 3. Radium has been used, especially in America, and while too early to pass an opinion it is probable this is a most useful avenue to explore. 4. Autogenous vaccines have been used without appreciable benefit.

[Surface erosions are cured with the electric cautery but not extensive glandular infection. Radium does more for the latter. The curet never cured a cervical infection.—Ed.]

5. If condition is advanced operation is usually required sooner or later, and various procedures may be adopted. *(a)* Uterine curettage can improve only the associated endometritis, and cannot sensibly affect the erosion. The ordinary curet cannot penetrate the hard

cervix sufficiently to be effective, and any improvement produced will be slight and evanescent. Berkeley and Bonney recommend scraping with a Volkmann's spoon, and this measure, combined as it may be with cauterization, is certainly effective in some of the less advanced cases. In a chronic condition which has penetrated to the glands and muscular tissue, however, it is difficult to see how all the affected tissue can be removed, and the usual experience is that, in such cases, recurrence takes place after improvement. *(b)* Trachelorrhaphy may cure the erosion, but the endocervicitis is likely to remain. There is a considerable tendency for the wound to break down after this operation, and the original lesion is re-formed. [Trachelorrhaphy has its only field in repair of the non-infected laceration.—Ed.] *(c)* Removal of the affected mucosa constitutes the only reasonably certain method. The erosion and the affected mucosa of cervix, usually the lower ¾ in. are removed, and the healthy lips of endocervical and vaginal mucosa approximated by catgut sutures. In advanced cases amputation of cervix is called for, but usually the plastic operation described by Bonney suffices, where the affected part is removed after reflecting the vaginal mucosa, which is afterwards inverted to form a new cervical canal. Sturmdorf's "coning out" operation is the same in principle as Schroeder's operation, where the cervix is split bilaterally and the affected mucosa removed, has been found by Strachan most effective in nulliparæ with resistant leucorrhea.

These operations are radical, but, in his experience, represent the only speedy and reliable prospect of cure. Regarding future impregnation and labor, Curtis, and others declare the former is not prevented and the latter not obstructed. He has personally attended two cases of labor after such a removal of cervical tissue, and in neither was there any difficulty with the first stage, while examination later revealed no fresh lacerations.

[Amputation cures the condition but reduces fertility and may produce sterility—excision has less effect on subsequent conception.—Ed.]

It is to be emphasized that as this lesion is essentially a precancerous condition, it is only by prevention or cure by one of the methods described that the onset of carcinoma can be effectively prevented.

[Too much stress cannot be laid upon the relation of persistent erosion in epithelioma.—Ed.]

Passive Hyperemia in Chronic Cervicitis. The apparatus made for G. L. Moench[8] is in 2 sizes:

> Two pieces of rubber tubing with a stopcock between were attached to the glass tube and connected either to a 250 c.c. Bigelow bladder syringe, or an electric pressure-pump. He found that about 15 inches of negative pressure was most desirable. The tube was applied through a bivalve speculum over cervix, the largest size that would pass being used. The air was now exhausted and the tube left on for about three minutes (this varied with the severity of case). After three minutes, the tube was removed and pus and mucus wiped away, or, if necessary, sucked out with pump through a small canula. Generally, after application of the suction tube, the mucus would come away very easily in contradistinction to the tenacity with which it usually clings. After the cervix was cleansed, the tube was reapplied and about one dram of 25% argyrol allowed to flow in through the funnel of tube without letting in any air. The small loss of vacuum was now made up by additional negative pressure. The tube was left on again for 2 to 3 minutes and kept tilted up so the argyrol covered cervix. Then, with the tube tilted up, air was allowed to rush in by opening stopcock. The mucus and pus are squeezed out of the cervical glands and canal by the hyperemic congestion and swelling of the cervix which squeezes together the gland and canal walls. If the pressure is now released, air will rush back as the cervix shrinks, because of the loss of vacuum. If, however, air is not available because argyrol completely covers the cervical os, the argyrol will be sucked up. After the treatment the cervical canal certainly showed argyrol in it.

Altogether has used the suction treatment of the cervix over 200 times with very good results in most, and improvement in every case, except about 6. The latter had abundant thin purulent discharges and hypertrophic cervices and, with one exception, were not reg-

(8) Amer. Jour. Obstet. and Gynecol., May, 1926.

ular in attendance. The only drawback to the passive hyperemia treatment is it requires time and patience. Generally two to three months of regular attendance two to three times a week were necessary to cure a severely-infected cervix. Improvement was, however, often seen even after 2 or 3 treatments. It was surprising how much mucus could be expressed at the first treatment from what appeared only as a mildly-inflamed cervix. After a few treatments, generally, very little mucus was left. A number who had not been pregnant in years, conceived shortly after the lesions had been cleared up. (Plate XXV.)

To have controls they at first ran parallel groups, treating one group with suction and 25% argyrol as described, another with suction and topical applications of argyrol, a third with argyrol only, a fourth with suction only, and a fifth with various other medicaments. In all cases the first group of patients did best. In 25 patients smears and cultures of the cervices were made at short intervals. In most cases the bacteria would decrease with the subsidence of the inflammation, but sometimes many bacteria would be present in an only slightly-inflamed cervix, whereas a marked cervicitis showed very few. Despite the fact that special gonococcus media were used in all cases, in addition to the routine ones, they were never able to grow any gonococci.

[Aspiration or suction with some instrument of the type described by Young, is the best method of emptying the cervical glands, and for reducing parametrial thickening. Our experience corresponds with that of the writer.—Ed.]

Cautery Treatment of Endocervicitis. The article by C. H. Davis was quoted in the 1925 volume, (p. 424). In a recent essay,[9] he states the technic used in his office is as follows: After a suitable bivalve speculum has been inserted, the mucous discharge is thoroughly removed with cotton applicators. A suitable light-weight

(9) Jour. Amer. Med. Ass'n., June 5, 1926.

cautery tip, preferably ½ to ¾ in. long, is placed firmly against the tissue to be destroyed and current turned on by pressing the button on cautery handle. As a sufficient depth is reached, the tip is gradually moved so as to make a line through the diseased tissue. In many cases it is necessary to cauterize only the glands near the external os and the eroded area; in others, the disease extends to the internal os. If at any time the patient complains of discomfort, the contact button is released and the current not applied again until she is comfortable. This process is continued until a sufficient number of cautery lines have been made. Nabothian cysts are destroyed in a similar manner after they have been punctured with the heated tip. An effort is made to reach the depth of the glands so as to destroy a part of the diseased tissue and all the bacteria. The lines are at least 3/16 in. apart, so only a part of the cervical glands are destroyed. This permits regeneration of fairly normal glands. If the patient is very nervous or conscious of considerable pain, they administer nitrous oxid-oxygen analgesia or anesthesia in the office. Only a few are now being sent into the hospital for cautery treatment. In many ways the analgesia is more satisfactory than complete anesthesia for the office patient. She can administer it herself according to the technic for self-administration during normal labor.

Since first report, an additional 180 patients, making a total of 317, have been treated by this method. A considerable number required 2 treatments, a few, 3; and one had 4 before healing was complete and permanent. One hundred and nine patients delivered by them have been cauterized before being discharged. Satisfactory healing occurs more promptly in patients cauterized within 8 weeks after delivery. Twenty-six patients are known to have become pregnant since the cautery treatment. Of these, 5 had early abortions and 2 miscarried during the sixth month, but all 7 had a history of one or more previous abortions. Six patients were pregnant at the

time of treatment and two of these aborted, one within 48 hours and the other six weeks later. Cautery treatment is used only during pregnancy for bleeding polypoid areas, and is limited to the external os. A few cases of long-continued sterility have apparently been cured by the cautery treatment.

Following a cautery treatment, there is a marked increase in discharge for about two weeks, and patient is warned to wear a napkin. She is told the next period may be more profuse than normal. A few patients have had excessive bleeding and have required a pack for a few hours. The patient is instructed to keep clean by frequent washing of the external genitalia. Douches are of questionable value, and as a rule women are warned against their use. It is found advisable to clean out the vagina and cervix every week or ten days and to paint the cauterized area with mercurochrome-220 soluble or compound Tr. of benzoin until healing is complete. A second cautery treatment is rarely indicated under four weeks, and very few require any more. Failure to clean out the cervix during the process of healing may result in a stricture of the external os. They had to dilate the cervix in four who were not under observation following repeated cautery treatment. The cautery should never be used during the acute stage of a cervical infection. Patients with retroflexion should not be cauterized until the uterus has been replaced and a proper pessary inserted. Subacute salpingitis contraindicates the cautery. Sex trauma should be avoided for at least two weeks after the treatment, and in extensive cases longer. The cervix should never be cauterized during an operation in which the uterosacral ligaments are to be shortened. Syphilis of the cervix contraindicates the cautery.

[Sexual trauma brings on bleeding after cauterization.—Ed.]

This treatment is not considered a cure-all, but experience with it has been so favorable they rarely advise

a cervical operation unless other surgery is needed. If a satisfactory result is not obtained, one may still resort to the Sturmdorf excision, tracheolorrhaphy or some type of amputation. They have operated on the cervix of only 4 patients previously treated with the cautery. Three were in the hospital for other surgery, and the cervix was repaired or amputated as an incident in the operation. One was sent in for a Sturmdorf excision about 7 weeks after a rather superficial cautery treatment because of impatience and desire for the quickest possible relief. She was cured of her cervical discharge, but after a year is still sterile. This is the most satisfactory gynecologic treatment possible in an office, and Davis knows of no other single procedure that has given such gratifying results.

[*These patients should always be observed if we expect to get results. During her child-bearing life operation on the cervix should—as a rule—be postponed.*—Ed.]

Electrocoagulation in Cervical Erosions. F. M. Mikels[1] urges that all erosions of the cervix should receive immediate therapeutic attention. If the simple erosion does not respond to medical treatment, it should be completely electrocoagulated and the cervix carefully treated until it is restored to a normal condition. The complicated erosions should be immediately treated with electrocoagulation and sufficiently to remove all pathologic tissue. Electrocoagulation is the most conservative method of treating inflammatory lesions in the region of the cervix and is the greatest safeguard against secondary malignancies. It is the method *par excellence* for extensive lesions of the cervix and is an adequate substitute for surgical enucleation. Is superior to surgery for lesions of the cervix because it is not followed by the formation of inelastic scar tissue which interferes with the normal function of the cervix that may be subjected subsequently to dilatation by parturition. One important physiologic effect should not be minimized *i.e.*, the pow-

(1) Surg., Gynecol. and Obstet., July, 1926.

erful bactericidal properties of the intense heat generated in tissues.

[When erosions are treated early after childbirth, whether by cautery or electro-coagulation, the underlying structures sustain little damage.—Ed.]

Fatal Cauterization of Cervix. The information given by W. W. Cross[2] was obtained from the attending physicians: The patient, aged 35, sought relief (April 21) for an irritating vaginal discharge. Examination revealed a discharge, irritation of vagina and vulva, skin of thighs showed discoloration, apparently caused by the secretion, the cervix was red, lacerated, and had granulating tissue protruding from the opening. Treatment consisted in 25% silver nitrate to cervix, and an antiseptic douche for use at home. The silver was used at intervals of four days. Twenty-two days following her first visit, menstruation occurred, and she was advised to have the cervix cauterized, as the local condition remained the same. Cauterization performed (June 2) with an olive-point electrode, the canal curetted, and the surface again seared over with olive point, the canal loosely packed with iodoform gauze; the gauze was removed June 4. The next morning, patient had chills, fever, and a general appearance of serious illness. At this time the husband discharged the physician.

From those who subsequently directed the treatment, it was learned patient had T. of 105, the circulation was embarrassed, and blood cultures were positive for streptococcus. Death on 8th day following cauterization. At necropsy surface smooth, normal in color and free from exudate, except over uterus, tubes, and ovaries. Here color was changed by a uniform red which traveled apparently along the course of the vessels; the uterus and appendages were not swollen or enlarged. When the genital canal was divided posteriorly, the cervix showed a slight discoloration, due to hemorrhage into

(2) California and West. Med., September, 1925.

the tissue. No evidence of trauma. Mucosa smooth, red and free of any evidence of trauma; the cavity free of membrane or débris. It is worthy of comment the embalmer injured his finger during the process of injection, and died four weeks later from septic poisoning.

[The foregoing case should be charged to the curet—not to the cautery. It is unfortunate that only the abdomen was investigated post-mortem. Examination of chest and cranium might have cleared up matters.—Ed.]

Gonorrhea. For treatment of uncomplicated gonorrhea, the following is suggested by H. W. Martin[3]: It must be demonstrated on the patient by a nurse who has been trained properly. A rubber sheet is placed on bed like an ordinary draw sheet. While this protects the bed, a little spilled tends to run over rubber in drops. To avoid this, place on top of the rubber sheet a cotton blanket folded and refolded to say two feet square on which the buttocks rest, with covers pulled down to ankles. (This may be reused many times without laundering.) Having first partially filled a glass on a stand or chair alongside the bed with about 25 c. c. of acriflavine solution—1:500 to 1:1500—from which glass of solution a Day syringe is inserted in vagina and gently emptied. (The vagina should have been previously cleansed by a douche.)

If the patient injects this solution in recumbent position and remains recumbent for at least half an hour, the solution will have abundant opportunity to penetrate into the walls and mucous glands of the cervix and not be rendered inert like most silver salts by the secretions. This procedure carried out twice a day will, in most cases, rapidly relieve the cervical gonorrhea and vaginitis, and this is also true even though it is an old case with salpingitis and an acute lighting up of the cervicitis, although it has no direct effect on the salpingitis. It cannot, of course, have an effect on Bartholi-

(3) Med. Jour. and Record, Feb. 17, 1926.

nitis. But the quicker the cervical gonorrhea can be cleared up without radical measures, the less probable the patient is to have later involvement of either the tubes of Bartholin's glands. Perhaps other drugs may prove equally beneficial. Certainly the silver preparations with the larger colloidal molecules, like argyrol, do not penetrate deeply enough. Perhaps none of the organic salts surpass protargol (which is also more economical as it can be used in more dilute solutions). It has considerable penetrating power and yet can be used sufficiently strong without irritation, so the proportion left over after the remainder of the drug has reacted with the secretions is certainly over 50% if the solution in sufficient strength is used in liberal quantity. A considerable factor is due to the fact the vagina remains filled (although not distended) for a sufficient time to allow penetration into the endocervix and cervical glands, and for this reason it seems superior to Kidd's simply swabbing with flavine solution, especially if the endocervix is swabbed out from time to time with acriflavin or silver nitrate after removing the plug of mucopus, as Kidd and others recommend. Nitrate of silver employed in the same way, if not very strong, would be immediately neutralized and its effect very fleeting.

For urethritis, ordinarily the gentle instillation of 40 to 50 c. c. of acriflavine solution—1:300 to 1:1000 into the bladder through a glass catheter and having the patient urinate immediately afterwards is recommended. The urethra is distended by urination and the flavine solution comes in contact with its every portion.

If a trigonitis and severe inflammation of the neck of bladder should develop, sometimes even to the extent of causing a terminal hematuria which, viewed cystoscopically, shows often a fibrinous deposition over an excoriation at the neck, instillations of argyrol—about 2%—in the same quantities and having the patient urinate immediately afterwards is advised. In a certain percentage, acriflavine fails and then other drugs must be

employed. For dysuria santal oil may at times be of value; but for this distress an abundance of fluids with Sodium citrate in 30-grain doses four times a day is more reliable. Food substances which irritate the urethra are interdicted, *e. g.,* alcohol, ginger ale, asparagus, etc. Tea and coffee are beneficial because they are diuretic. Lemonade and most fruit juices are also beneficial; the acids in these are oxidized to carbonates and tend to alkalinize, rather than acidify, the urine (vinegar excepted). Prohibiting tomatoes and other articles containing oxalic acid is entirely unnecessary.

[Irrigation with gradually-increasing strengths of silver nitrate solution gives the best results in trigonitis, or direct application of argentic nitrate through a Kelly cystoscope may be employed.—Ed.]

A very young patient, 4 years, was under the care of M. Gleich[4] for gonococcal peritonitis, complicating vulvovaginitis: She awoke suddenly one evening complaining of severe pain. This pain, followed by vomiting and fever, continued all night. On examination next day the child was moribund. The abdomen was soft and relaxed. No tenderness evident. The labia and introitus red. No vaginal discharge. Twenty-four hours from the onset, the child succumbed. Necropsy revealed acute, diffuse peritonitis, with markedly inflamed tubes, ovaries and endometrium. About 4 oz. of odorless, purulent fluid obtained from pelvis. The liver and spleen were studded with necrotic foci. Smears from pus and vaginal mucosa showed intracellular diplococci and many pus cells.

Peritonitis following gonorrheal vulvovagino-endocervicitis is rare. When it occurs, it soon becomes chronic and is localized in the pelvis. This peritonitis, generalized and hyperacute, extended from the external genitalia. The fulminating character of the attack probably points to the adult type of gonococcus as the offending organism, the infantile type is usually associated with

(4) Jour. Amer. Med. Ass'n., March 13, 1926.

the "explosive" yet chronic and localized peritonitis.

M. Y. Dabney[5] recommends the following *routine in non-pregnant subjects:*

(1) All acute cases are preferably put to bed for 7 to 10 days.

(2) *Physician's Treatments:* (*a*) For a week or ten days daily, and then every other day throughout the treatment, the cervical canal is swabbed with a cotton applicator dipped in one of the following: 10% argyrol, 2% silver nitrate, 1% acriflavine, and 2% mercurochrome. (*b*) On the same occasions 10% argyrol or 1/2000 acriflavine is instilled into the bladder. Should the urine contain pus, the instillation is preceded by irrigation with normal saline.

(3) *Patient's Treatment:* (*a*) One dram of 10% argyrol is injected into vagina by a glass McElroy male syringe while patient is lying upon her back in bed. A thick guard is applied and the argyrol is retained all night if convenient. (*b*) An alkaline cleansing douche is taken next morning. (*c*) Argyrol is instilled into the vagina after breakfast, retained for one hour, and douched out. (*d*) For an hour after lunch, argyrol is kept in the vagina and then removed by a douche. (*e*) At bedtime argyrol is placed in the vagina for the night, etc. (*f*) The patient is requested to occupy a bed by herself and under no conditions to engage in coitus till pronounced well. (*g*) As is desirable in all infections, fluids are forced.

[Active local treatment of the cervix in acute cases is dangerous, and only spreads the disease by breaking down local barriers.—Ed.]

A series of 50 cases were treated by E. D. Barringer[6], 25 by mercurochrome, and 25 controls by other methods. There were but 2 acute cases, both in controls. Her best results with mercurochrome were obtained in subacute cases, or chronic cases without erosion. Here it proved

(5) Southern Med. Jour., May, 1926.
(6) Long Island Med. Jour., June, 1926.

of definite value, and compared very favorably with other drugs. There was a preponderance of erosions on the series treated with mercurochrome, 18 as against 12. Erosions in the majority reacted badly to mercurochrome, which seemed to act as an irritant. Reduction in the strength of mercurochrome from 1/2% to 1/4% did not seem to help its action. Urethral instillation of 1/2% mercurochrome was used with success; bladder irrigation with 1/5% mercurochrome also proved successful. No toxic symptoms were noted from its use in the bladder. Syphilis may become a trying complication in the treatment of gonorrheal erosions of the cervix, as the diagnosis of a chancre before other symptoms develop may prove difficult or impossible.

Vulvovaginitis in Children. In 54 out of 63 cases, the gonococcus was demonstrated by A. R. Fraser[7] in vulva and vagina, and in rectum in 59. Symptoms were entirely vulvovaginal. The average age of the patients was 4.7 years. In only one was there any upward spread of the infection with resulting peritonitis. No other complication was noted. Investigation of the origin of the disease proved unsatisfactory. In 27, no origin could be traced. In 11 there was some evidence of infection of the parents, while in 17 cases servants were implicated. Three patients traced contamination to the lavatory seats of trains following long railway journeys. In only one was there attempted rape.

[It would be interesting to know what the condition of the cervix was in these children—as we believe that many of the endocervicitises in virgins originate from extension of vulvovaginitis of childhood.—Ed.]

Double Pyosalpinx at 5 Years. The operator, G. R. Burke[8] states the child was admitted (Porto Rico) Aug. 1, with pain, vaginal discharge and fever. Mother said patient had been well until four days previously, when she complained of pain in right abdomen. At same time

(7) Med. Jour. S. Africa, (quoted in Jour. Amer. Med. Ass'n., Jan. 23, 1926).
(8) Jour. Amer. Med. Ass'n., July 3, 1926.

she passed 5 roundworms, and a purulent vaginal discharge noticed for first time. The pain and discharge continued, accompanied by feverishness and obstinate constipation. The mother gave a purgative day before with no result, and an enema the morning of the day of admission, with results. The child was considered too ill to be operated on, and in the hope that the process would localize was given a rectal drip of tap water, in the modified Fowler's position.

Aug. 19, at operation, the diagnosis was appendicitis with peritonitis and possibly salpingitis. The intestines were adherent to the parietal peritoneum and to one another. The appendix in midline posterior to bladder; greatly inflamed and adherent to intestines but had not ruptured. The tip was adherent to the right wall of pelvis along with the fimbriated end of right tube, which was thickened and inflamed. While appendix was being freed, a small cavity in the tube end opened containing a small amount of cheesy pus. The left tube was thickened and inflamed on the fimbriated end and was adherent to pelvis. When it was freed 3 or 4 drops of whitish pus escaped into the culdesac. Enough adhesions freed to allow appendectomy and double salpingectomy, but no attempt to explore upper abdomen. Uneventful recovery. From the microscopic nature one would assume that the process was primary in the tubes and secondary in the appendix and peritoneum.

Bactericidal Property of Whole Blood. G. H. Robinson[9] finds the whole blood of normal persons possesses but little bactericidal action upon the gonococcus. The blood of women having a gonococcal salpingitis exerts a strong bactericidal action on the gonococcus, most marked upon the infecting strain, indicating a tendency toward strain specificity. This reaction is not dependable enough with heterologous strains to warrant use as a diagnostic procedure. Treatment of chronic gonococcal infection with either stock- or autogenous vaccines

(9) Jour. Infectious Dis., July, 1926.

would seem theoretically to offer little hope of success.

[Clinically autogenous vaccine in gonococcus infection seems to help.—Ed.]

Gonorrheal Endocervicitis. Though L. Brady[1] does not claim mercurochrome is superior to other plans of treatment, he found strong solutions effective when other drugs were of no avail. In all instances not complicated by salpingitis or Bartholinitis, a real cure followed. The simple technic and minimal danger of salpingitis following are distinct advantages.

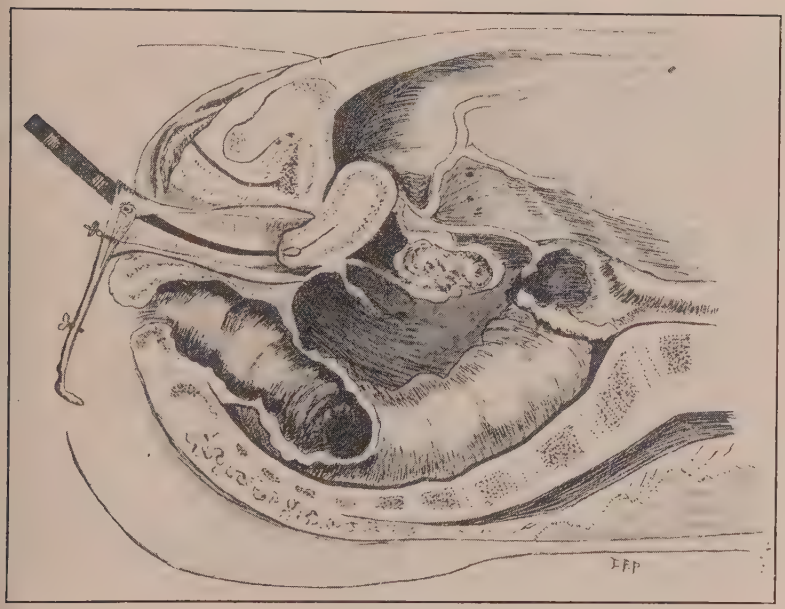
According to Walther and Peacock[2], *treatment has been much simplified* by diathermy: The method is rational. It effectually destroys the gonococcus *in situ*, leaves no scar tissue, materially shortens the time usually required for treatment, is painless and is clean. A rigid technic, to be followed in minute details, is imperative if success is to be expected. The procedure is not complicated, however, and can be easily mastered after observing several demonstrations. Thirty-eight cases of gonococcal endocervicitis cured by diathermy form the basis of this report, is prompted by a feeling that, were the method better understood, many might be encouraged to submit it to clinical trial. (Plate XXVI.)

[Diathermy in endocervicitis is yet in an experimental stage—many times disappointing. Larger experience from creditable clinics is desired.—Ed.]

Simple Device for Cervical Gonorrhea. This is described by A. Poska[3]: It consists simply of a section of glass tubing, 20 to 24 cm. long, 5 to 8 mm. in diameter, with an inside diameter of 2 to 6.25 mm. One end has a 2 to 2.5 cm. bevel, while the opposite end is ground square with the sharp edge rounded off. The beveled end to facilitate loading of device and minimize soiling with medicament. A glass rod for the larger sizes, and the long round wooden applicator for the smaller sizes to act as a plunger, complete the apparatus.

(1) J. Hopkins Hosp. Bull., December, 1925.
(2) New Orleans Med. and Surg. Jour., March, 1926.
(3) Northwest Med., June, 1926.

PLATE XXVI.



Method of applying Peacock electrode in endocervicitis.—Walther-Peacock, page 466.

Generative organs and pelvic peritoneum of patient, of 30 (necropsy). The sacrouterine ligaments and uterorectal muscle stand out plainly. Ovaries lie directly over vascular area of peritoneum, which is commonly affected by varicosity.

The mattress-suture described is in place. The needle is in the rectal danger area and should not be carried to this point. (The heavy suture material here is used for the sake of clearness.) The peritoneal position of ureter is indicated by a dotted line. The suture is a safe distance from the uterine circulation and ureter.—Emge, page 470.

The tube is carefully dried, a small pledget of cotton is forced through the tube and packed tightly in square end. From .05 to .15 gm. of medicament is then introduced with a waxed powder paper, and another small pledget of cotton introduced with a suitable plunger.

The cervix is swabbed off with a saturated solution of Sodium carbonate; the canal is cleaned with the same solution on small swabsticks, carefully dried, and usually a 20% solution of nitrate of silver applied, followed by iodin. The canal is again dried and, the pledget of cotton having been removed from the end of tube, it is applied to cervical canal and contents ex-

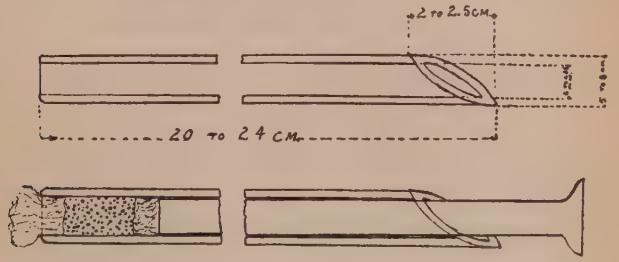


Fig. 39. Device for treating cervical gonorrhea (Poska).

pressed into the cervix. The small pledget is allowed to remain in cervix, thus retaining the medicament.

A cotton tampon is placed against cervix, and held in place by a lamb's wool tampon, and the whole allowed to remain until next morning, when the permanganate douches are resumed. (Occasionally Battey's solution is used alternately with the nitrate-iodin treatment.)

The medicament consists of mercurochrome-220 crystals, finely pulverized to prevent packing in the tube, or neutral acriflavine either in powder form or in the well-ground tablet. The objection may be raised that this amount of a mercurial preparation in the cervix may possibly cause toxic symptoms, but as far larger amounts are introduced directly into the blood without

harm, it will be seen that the objection is groundless.

The greatest criticism to which this method is open is that, due to the moisture in the cervix, the medicament packs in the end of the tube. This may be easily overcome by using a small amount of medicine proportionate to the diameter of the lumen of the tube.

The tubes take but a few minutes to make and last indefinitely. A tube of proper length is cut with a file, and the bevel made by cutting the tubing on the coarse side of a No. 110 carborundum combination-stone, finishing on the fine side. The sharp edge is likewise worked off on the stone. Three-in-one oil is used as a lubricant. It is surprising how easily the glass works on this stone. The tubing is sold by the pound, and 50 cents' worth will last several years.

[This technique can hardly be called "simple." All treatment within the cervical canal carries with it dangers of spreading the infection.—Ed.]

Tuberculosis Confined to Uterus. In his discussion of tuberculosis involving the adnexa, C. Daniel[4] points out that the Koch bacillus may reach the uterus by 2 routes —*via* the blood, or *via* the mucosa, the latter may be (*A*) along the tubes or descending; (*B*) along the vagina or ascending. The latter is usually thought to be very rare, but is real none the less. The author collects 39 instances from the literature to which he adds a personal case. The latter corroborated by laparotomy, showing primary and isolated tuberculosis of the endometrium, with tubes intact or recently invaded, corroborated also by experiments on guinea pigs, which proved the uterine mucosa is capable of receiving the Koch bacillus, and that the tuberculous lesions set up at the point of inoculation (uterine mucosa) are susceptible of reaching successively the upper genital passages (tubes), the abdomen (peritoneum), the tributary lymph nodes (iliolumbar), finally of causing generalized tuberculosis.

The coexistence of uterine and tubal lesions of dif-

(4) Jour. de Chirurgie, February, 1926.

ferent stages seems to be an argument in favor of ascending infection. Histologic sections show the lesions in endometrium to be older than those in tubes, confirming the ascending route. At other times, the cervical stage being skipped, the corporeal stage (in fundus) may be reduced to minimal lesions of tuberculous endometritis, and the terminal tubal is most severe. Lastly "the superficial nature of the endouterine lesions, their localization in the mucosa—either as disseminated miliary tubercles with little tendency to invade the depths of tissue, or as tuberculous endometritis with caseous degeneration and pyometra" are further anatomopathologic proofs in favor of ascending infection.

[Tuberculous infection of the endometrium is a proven entity, but is usually secondary to the tubal infection.—Ed.]

Actinomycosis of Tubes and Ovaries. Helwig's case of this unusual condition was cited in the 1925 volume (p. 435). Another example was met with by Draper and Studdiford[5]: Patient, of 36, operation for supposed tuberculous salpingitis, when pathologist's report was received KI was begun, death on 80th day. It is impossible to prove the exact origin of the disease in this case, but the facts noted at operation, *i. e.*, the probable lesion of the small intestine and the proved lesion of the omentum, where it was adherent to the head of cecum, would make it seem quite probable that the portal was somewhere along the gastrointestinal tract, possibly in the region of cecum. Having gained the subperitoneal tissue, the organism, by its characteristic burrowing invasion, may then have passed down to the pelvis, infecting adnexa, and up to diaphragm, giving rise to subdiaphragmatic abscess and marked invasion of the right lobe of liver. Opposed to this origin, infection by means of a pessary and secondary involvement of the abdominal viscera, may be considered. However,

(5) Amer Jour. Obstet. and Gynecol., May, 1926.

this sequence does not seem as probable as the uterus appeared normal. In connection with the question of intestinal infection it is interesting to note that after careful search, both gross and microscopic, no lesion of the mucosa could be demonstrated Some writers explain it by stating that some small acute lesion, necessary for the passage of the organism through the mucosa, heals and leaves no trace; others state that the organism can pass the mucosa without a lesion. The actinomyces, once having gained the connective tissue planes, spread by the direct invasion of contiguous structures. The frequency with which abdominal actinomycosis is situated in the right fossa is said to depend on a relation to the cecum and appendix. It is claimed that the latter organ occupies the same position in relation to abdominal actinomycosis as the carious tooth does to the cervicofacial type. It is frequently affected by trauma and inflammation, the consequent breaks in the mucosa allowing the actinomyces, if present, to pass to the subperitoneal tissues and set up a chronic abdominal actinomycosis. The appendix in this case showed an obliterative process as definite evidence of previous inflammation, although no history of appendicitis was obtained. Writers are practically unanimous in stating that spreading of the process takes place by direct extension and, occasionally in the late stages, by the blood stream. The statement occurs repeatedly that extension never takes place by lymphatics and that the nodes are never involved. This is often given as a differential point between this disease, malignancy, and tuberculosis. Only one recent case could be found in which definite lymph node involvement was described. It is, therefore, interesting to note the mesenteric nodes in this case showed definite actinomycotic abscesses.

The Surgical Treatment of Pelvic Varicocele is discussed by L. A. Emge[6]:

(6) Jour. Amer. Med. Ass'n., Nov. 28, 1925.

TABLE 1.—*Varicosities Observed at Operation*

LOCATION	
Bilateral:	
Broad ligaments—base	7
Broad ligaments—ovarian veins	3
Broad ligaments—ovarian veins and pampiniform plexus	3
Broad ligaments—pampiniform plexus	1
Ovarian veins	5
Ovarian veins and pampiniform plexus	1
Right:	
Broad ligament base, ovarian veins, pampiniform plexus	1
Ovarian veins	1
Left:	
Ovarian veins	1
Others:	
Rt. broad ligt. base, rt. ovarian veins, left pampiniform plexus	1
Total	24

RELATION TO PAIN

Pain		*Varicosities*	
Bilateral	9	Bilateral	20
Sacral	7		
Right	7	Right	3
Left	1	Left	1

DIAGNOSIS

Varicosities by examination	8
Varicosities by deduction and examination (8 and 4)	12
Parametritis and displacements	4
Displacements	8

TABLE 2.—*Symptoms and Associated Disease Conditions*

SYMPTOMS

Pelvic pain:		Other complaints:	
Bilateral	9	Dyspareunia	3
Left	1	Dysmenorrhea	13
Right	7	Hydrorrhea	5
Sacral backache alone	7	Menorrhagia	5
Influence of position:		Constipation	7
Worse upright; better recumbent	12	Onset at childbirth	8
Indifferent	12	Married	12
		Single	12

PATHOLOGIC CONDITIONS FOUND AT OPERATION

Aside from Varicosities

Retroversion	14	Appendix grossly abnormal	12
Retroversion and descent	6	Cervical disease	8
Descent alone	3	Perineal relaxation	5
Parametritis	2	Cystic ovaries	12
Salp. isthm. nod.	1	Small myomas	1
Sigmoidal adhesions to brd. lig.	3		

The vast majority of varicose veins of the female pelvis are a direct result of damage to the fibro-elastic suspensorium. Only a small portion is the result of actual lesions in the walls of the venous channels. Since the suspensorium is intimately attached to the pelvic peritoneum which forms the covering of the basal ligaments of the generative organs, it is possible to obtain

a normal control of the veins of these organs by increasing traction on this peritoneum. This traction is obtained by shortening the sacrouterine and associated ligaments and aided by a round ligament transplantation. The permanence of this procedure in regard to anatomic and functional results has been established by actual inspection and by the freedom from symptoms for 1 to 7 years and after childbirth. Resection of veins is ordinarily unnecessary and should be confined entirely to varicosities that are the direct result of inflammatory lesions of the vessels in question. (Plate XXVII.)

METHODS PROPOSED:

Resection (excision) of veins: Dudley, 1888; Hirst, 1890; Miller and Kanavel, 1905; Darnall, 1914; Fothergill, 1921; Rowse, 1921; Sihler, 1921; Schubert (occasional castration), 1922; Castaño, 1921, 1925.

Multiple ligation of veins: Kelsall, 1921.

Castration: Malins, 1889; Nielsen, 1889; Wilson, 1891.

Resection and oöphorectomy: Chalier and Dunet, 1921.

Resection or ligation of veins and ventrifixation: Kelly, 1890; Shober, 1901; Wall, 1916; Cotte and Jezditch, 1923.

Ventrifixation: Engelmann (occasional castration), 1922.

Shortening of sacrouterine and round ligaments: Emge (occasional resection), 1921.

[Pelvic varicocele is an entity which must be differentiated from subacute inflammatory lesions. A direct result of childbirth trauma. The symptoms are always relieved by woman assuming the recumbent posture, and improved surgically by establishing a plane of circulatory equilibrium in the pelvic veins.—ED.]

TUMORS AND MALFORMATIONS

TUMORS

Cancer of Vulva. At the Kansas City General Hospital, 1920-5, there were 100 admissions for malignant tumors of genitalia, but one occurred in vulva (clitoris). Twyman and Nelson[7] collected 19 others from their local

(7) Jour. Missouri State Med. Ass'n., May, 1926.

colleagues: Eight have results above the average; and this in the cases subjected to early radical procedure. If less time were wasted in palliative treatment, and if the cautery were used to prevent cell implantation and to reseal the uninvolved spaces that are operatively opened, and if the surgical attack, instead of being timid and expectant of failure, should take courage from the favorable histology and be planned radically as in breast and lip cases and based on an expectation of success?

These cases appear to have suffered as much from concealment and from timidity of attack, both of which are factors that can be changed, as they have from their unfavorable situation which, of course, cannot be changed. Some excuse for this condition is found in the comparative rarity of the cases and the dread-inspiring reputation they bear. Taussig says in part: "Systematic education of the laity regarding the significance of pruritus and small ulcers about the external genitals will doubtless aid considerably in the early recognition and treatment of the disease. Of even greater importance, however, is the education of the profession on this subject. * * *. We may hope for a reduction in the mortality from vulvar cancer when both the laity and the profession awaken to the importance of excising the vulva in the precancerous stage of leukoplakic vulvitis.

[All cases of pruritus of the vulva should be examined locally. Leukoplakic vulvitis is a precancerous condition. The involved area should be excised, all small ulcers should be excised, base sealed by cautery and microscopic diagnosis made.—Ed.] Excision at this stage will produce almost 100% cures and we may hope for a material decrease in the death rate through operation at this early stage." One may conclude, that through pessimism we have failed to an extent in our duty of lay education and in our own practices. This study suggests a more hopeful procedure.

[In operating the procedure should be in two stages: (1) Removal of inguinal glands to block extension. (2) Radical excision of growth sealing the underlying tissue with cautery. Symptoms come early but are seldom recognized.—Ed.]

Widespread secondary growths from a vulval cancer, occurred in a patient, of 43, under the observation of A. E. Chisholm[8]: Admitted April 5. Had noticed a wart-like growth on labium for over a year, and for 10 months had caused severe pain at times. As time went on it increased, ulcerated, and became more painful. On April 15th, he excised the tumor along with the labium minus and dissected out the glands of groin. The pathologic report indicated flat-celled epithelioma. The patient was discharged May 17th. In October, there was definite emaciation, but no recurrence in vulva, and a *per vaginam* examination revealed nothing abnormal. A very small nodule could be felt just below the outer limit of inguinal scar. The glands in other groin markedly enlarged. Dozens of discrete, subcutaneous, mobile nodules, of varying sizes, could be seen or felt over the abdomen and chest. The axillary glands were enlarged, as also those of the right anterior triangle of the neck and of both posterior triangles. There was a nodule just in front of left masseter and one above the eyebrow. Nov. 14, was looking very ill and had a good deal of pain in back. The movements of the lumbar spine were pretty good. No evidence of involvement of internal organs. The subcutaneous nodules showed evidence of growth since the last examination and some of them were livid. The nodules on anterior abdominal wall were innumerable. Death, Jan. 6.

Sarcoma of Vulva. This occurred in a young subject (45 months). First seen by C. W. B. Littlejohn[9] Dec. 19, 1923, endothelioma of right labium majus (first noticed 10 months before), removed. For prophylaxis

(8) Lancet, May 22, 1926

(9) Med. Jour. Australia, May 15, 1926.

an intensive dose of *x*-ray had been applied to pubes and groins. Jan. 16, 1925, a recurrence took place in glands of left groin. These had been removed, but not very completely. Jan. 1, 1925, *x*-ray repeated as before. On Aug. 5, no signs of recurrence and child was doing very well. Nov. 18, patient was evidently going down hill, emaciated and cachectic. The right limb had appeared somewhat larger, the superficial abdominal veins on left being dilated. A palpable, tender mass had been present on left side of abdomen. The parents, however, had urged giving another chance, as they were convinced that earlier treatments had in each instance effected considerable improvement in the general condition. Despite the poor condition, particularly its listlessness, a full dose had been given to the abdomen on Dec. 27. Improvement had taken place rapidly and had since been most noticeable especially in her general and mental condition. She had gained weight considerably and the masses had become practically impalpable, while the swelling of left thigh and venous dilatation had disappeared.

[Extensive operation with prolonged anesthesia breaks down patient's immunity.—Ed.]

Melanoma of Vulva. Three cases of the malignant type, all on labium majus are narrated by J. L. Goforth[1]: Patients of 36, 56 and 66, respectively. His study corroborates the opinion of others that they are of epithelial origin. Practically all that have been reported terminated fatally in a relatively short time after treatment. Of his series, Case II was well without signs of recurrence 7½ years after radical treatment; Case I, with the remarkable history of four recurrent growths, 5, 7, 7½, and 9 years, respectively, after the primary one, finally terminated fatally 9½ years after the initial appearance. It would appear that radical operative procedure at least retarded the disease, even though the hoped-for eradication was not accomplished.

(1) Surg., Gynecol. and Obstet., September, 1926.

Postoperative irradiation proved of little or no value in arresting the progress in this case; there is some evidence, however, that relief of pain to a helpful degree was afforded. Case III when first observed was moribund from generalized melanosis.

Goforth feels emphatically that malignant melanoma should be essentially a preventable disease. A pigmented nevus or spot about the vulva, or elsewhere, even though apparently innocent, is potentially malignant, and its presence should command prompt and proper treatment. The presumably benign nevus should be excised with a wide margin of healthy tissue surrounding it in all directions. Those showing unusual symptoms and signs, *e. g.*, enlargement, increased vascularity, or ulceration, should be radically removed, preferably with the cautery-knife, together with the regional lymphatic system. Pringle states that "a radical extirpation of the disease will be most certainly ensured by excision of the tumor, with a good zone of healthy skin around it, and a somewhat larger zone of the underlying deep fascia up to and including the nearest anatomical group of glands at least; and all that is removed should be in one continuous strip as far as possible." The same dictum, applied more radically, holds for those cases which are very definitely malignant and for those that show recurrent growths.

After the malignant transformation of a nevus, growth is rapid and metastasis occurs relatively early. Generalization, occurring usually within 3 years from the time of evidence of malignant change in the primary growth, establishes itself through direct invasion of a vein or capillary from either the growth itself, or involved lymph nodes, or from the lymph glands directly, through the thoracic duct to the blood stream. With this course in mind, it follows that the proper sequel to proper treatment is a frequent "follow-up" and thorough examination. This gives patient the obvious advantage of the earliest treatment of a local recurrence, and permits,

at the same time, the surgeon to know the true results of his treatment.

[Again let us call attention to the importance of first removing the glands *en bloc* to prevent metastasis while handling the original growth. Excision of these is most important.—Ed.]

Carcinoma of Clitoris. In this instance the patient was 56, and was operated on by J. C. A. Gerster[2]: One year ago she noticed a painless lump in both groins, the right larger than the left. Also a mass in the vagina, which was tender and bled easily. On physical examination the patient proved to be obese in fair condition, whose general condition revealed nothing abnormal, considering her weight and age. Locally there was a tumor the size of a cherry involving the distal half of the clitoris, tender and ulcerated. There were hard painless masses in both inguinal regions 3 x 4 cm. in extent on the left and 2 x 6 cm. on the right.

March 13, under local anesthesia, a wide excision of the clitoris and its adjacent tissues down to the symphysis was made with an electric cautery knife. The following day, under local anesthesia, a block dissection of the right inguinal region with extirpation of nodes and parts *en masse* down to deep fascia was made. This included stripping of subcutaneous fat from inguinal region to vulva. March 15 a similar excision on left side. Naturally the wounds were mildly infected but she was discharged April 6, 1924. Since then she has received radiotherapeutic treatment. A few weeks prior to report a tender swelling was noted in the left major labium. An abscess formed, opened spontaneously, and the mass disappeared. Several similar tender masses present in right side of mons veneris apparently inflammatory. There is some erythema of the skin in both inguinal regions, but so far no signs of recurrence. She has not lost weight. Microscopic examination showed a prickle-cell epithelioma of clitoris with secondary depos-

(2) Annals of Surg., November, 1925.

its in both masses of inguinal nodes at their centers. The outlying nodes showed congestion and hyperplasia.

Urethral Caruncle. As regards treatment of this distressing ailment, P. A. Ferrier[3] emphasizes that of various plans proposed the *essential of all is complete ablation of that part of the basement membrane bearing the tumor.* If it is left, the tumor will recur. Pinching, snaring, ligating, cutting, cautery by heat or acids, fulguration, and other methods have been used. Excision when skilfully done, leaving circumferential mucosa, is useful, particularly in the extensive sessile type. It has the advantage of getting beyond the farthest margin and of preserving tissue. But it is a hospital procedure with prolonged convalescence. Fulguration is apt to burn unnecessarily deep, leaving a heavy scar with subsequent deformity and, in any case, an eschar, which separates, leaving a wide granulating surface to epithelialize slowly. Repeated fulgurations are often necessary. Cautery by heat has the same objections, and acids are even less subject to control.

A very satisfactory method for all but the broadly sessile type is the clamp-and-cautery (Crenshaw). The patient is placed in lithotomy position and, after soap and water cleansing, local anesthesia is obtained by a 10% cocain jelly swab in urethra for a few minutes. An assistant separates the labia. The urethra is dilated and the growth defined. The caruncle is picked up with a fine forceps and clamped beyond its base with a miniature hemorrhoid clamp. The protruding caruncle is cut off and preserved for section, while the cut edge is cauterized with 15% acid of nitrate of mercury on a swab. Lateral tags are treated in the same way. As a modification, Ferrier has found it at times desirable, if the tumor be sessile, to hold it with more than one fixation forceps in order to draw it all into the clamp. And, to avoid the uncertain control of the acid caustic, he prefers a small electrocautery such as is used by nose and

(3) California and West. Med., April, 1926.

throat surgeons, searing the cut edge exactly as in the clamp-and-cautery operation for hemorrhoids under infiltration anesthesia.

[Clever suggestion, but the application of a few hours of radium to the growth cures without pain or inconvenience.—Ed.]

Electro-desiccation for Urethral Caruncle. J. B. H. Waring[4] writes this distressing condition is more common than one might suspect; because women thus afflicted often will suffer for years, rather than seek professional aid. It more properly belongs among vulvar tumors than among diseases of the urinary apparatus, although it usually involves the mucosa surrounding the external meatus.

Surgical excision under local anesthesia suffices to remove many of the more pedunculated caruncles; but the effort to remove most of them with the scalpel leaves much to be desired. Likewise, application of caustics in this region is well-nigh taboo.

Electro-desiccation is well described as the ideal here. Under light cocain surface anesthesia, these new growths may be electro-desiccated or dried up with a nicety that is most gratifying. No pain, no bleeding, and very little local irritation. Using a light spark from the Oudin terminal of a good high-frequency apparatus, and controlling work better with a binocular loupe employed in eye work, the smallest extensions of the caruncle may be destroyed, leaving healthy mucosa practically undamaged. With very nervous patients several light treatments may be given over a period of weeks; but, as a rule, the treatment is so mild the condition may be cleared up at one session. After-treatment consists merely in proper toilet, and any soothing ointment for a few days until the slight irritation produced is abated. Unless the minutest roots of a caruncle are destroyed, there is a marked tendency to recurrence; so patients

(4) Therapeutic Gaz., Dec. 15, 1925.

should be kept under observation for some months, until satisfied the lesion is destroyed beyond return.

Vaginal Myoma. Two instances came under the observation of D. Dougal[5]: (I) Patient, aged 42, complained of a bearing-down sensation, and when defecating a mass protruded from vulva and had to be pushed back. Examination showed a tumor about the size of a tennis ball arising from the lower anterior vaginal wall. Its consistency was soft, like a degenerating fibroid or a cyst with viscid contents. It was easily enucleated vaginally and proved to be a myoma showing early hyaline changes. (II) Aged 29, complained of soreness and swelling in vagina, and pain on micturition a yellowish discharge had been present for a fortnight. The vaginal orifice was being partially closed by a crescentic hymen; protruding through the orifice was a dark red tumor 1 in. wide, tender, surface raw in appearance and covered with muco-pus. Under the anesthetic the orifice was enlarged and tumor removed. It was a lobulated growth from anterior wall and covered by mucosa, except at the lower pole where it had ulcerated through capsule and given rise to the purulent discharge. It proved to be a myoma, the lower part being enormously vascular and showing inflammatory changes.

D. Tuberowsky[6] met with *3 more examples:* (I) Patient, of 40, pain in left lower limb especially when walking. The tumor (2.5x1.25 in.) occupied left wall of vagina, and having no capsule was readily enucleated. Microscopically a pure myoma, with few capillaries, and lymph spaces lined with endothelium, no trace of glands. The author points out such fibromas of vagina are very rare. They may possibly spring from the Wolffian or from the Müllerian duct; a third possibility is the uterus itself. (II) Size of hen's egg, removed from posterior wall in patient, aged 30, diagnosis of

(5) British Med. Jour., Jan. 23, 1926.
(6) Ztrb. für Gynäkol., Feb. 20, 1926.

"cyst" on account of the consistence. Here the structure was that of a nearly-pure myoma, with many vessels and glandular cavities lined with cubical cells similar to those of the cervical glands. Owing to the latter, origin supposed to be from Müller's duct or uterus. (III) Size of large cherry, firm and elastic, on anterior wall, removed from subject of 28, also mistaken for "cyst." On histologic examination proved to be myoma with mucoid degeneration, poor in vessels and devoid of glands. In this instance the origin was probably submucosa or the vaginal muscularis.

Fatty Tumors of Uterus. A case of these rare new growths came under the observation of A. C. Starry[7] in a patient, aged 64: Complaint of frequent urination and a dragging sensation in the pelvis. She stated that she had suffered this pelvic distress from time to time for 30 years. No history of uterine bleeding. Menstruation began at 11 years, had been regular, and of the 28-day type. The menopause occurred at 50. She had had 3 normal pregnancies, and 2 miscarriages. Examination revealed the uterus very large and tipped back into the hollow of sacrum. A diagnosis of fibroma was made, and a total hysterectomy together with a repair of cystocele was done under local anesthesia. Recovery uneventful. (Plate XXVIII.)

The uterus and tumor measured 8½ by 11 cm. The perimetrium perfectly smooth. The cervix was attached and stretched out 8 cm. long. The tumor occupied all of the posterior and right lateral wall of uterus. The cavity was pushed to the left and markedly distorted by the mass. The entire tumor was covered with about 5 mm. of uterine muscle. The endometrium was smooth, somewhat hemorrhagic and rested upon about 2 mm. of muscle fibers. Sections presented a very lobulated structure; the lobules varied in size from a cherry to a hen's egg and were very irregular. Some were white and firm and like an ordinary fibroma; others were soft and

(7) Surg. Gynecol. and Obstet., November, 1925.

edematous. One lobule especially was dark yellow, soft and appeared like a large lobule of fat. Sections from various parts of tumor showed it to be made up of true fat tissue, fibrous and smooth muscle tissue. The fat cells were large with the usual flattened nucleus pushed to one side. In the larger areas the cells were closely packed and polyhedral. Bands of connective tissue passed through the larger areas of fat and occasionally small islands of smooth muscle cells were noted. Sections from the more fibrous areas showed many fat cells scattered throughout, either in small groups or singly. This case shows that developing fat cells may be found in fatty tumors of uterus. These develop from connective tissue cells which probably represent a specially differentiated type of connective tissue cell.

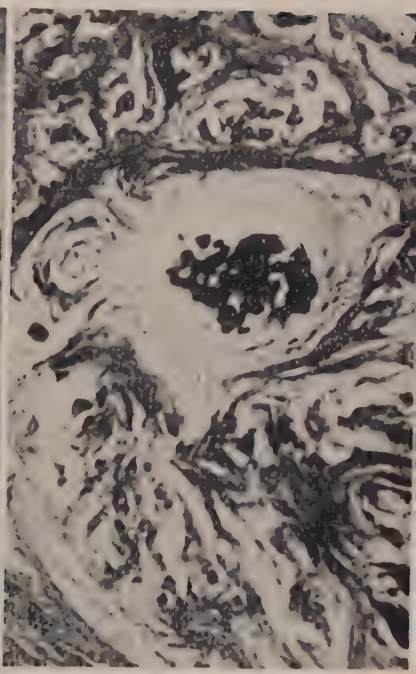
[A most unusual finding.—Ed.]

Multilocular Uterine Cyst From Wolffian Duct. M. Seliga[8] the operator, states the course of the duct is rather exactly known save at a few points which are still disputed. For its whole extent the duct or its remains may degenerate into cysts or cystic formations. Small cysts are common and usually discovered accidentally. Those of some size are on account of their location described, as a rule, as "vaginal cysts," less often they are met with between the uterus and the ovaries. Uterine cysts, particularly of large size, are relatively rare.

In this instance the patient was 51. The growth size of child's head could not be freed from uterus, and subtotal hysterectomy was done. Entire surface bosselated, and was of usual consistence of cysts, on palpation 4 large ones and many small ones detected. Contents serum or thick brownish fluid. The larger ones, lined with a smooth membrane had the characteristics of a myo-adeno-cystoma, formed by active proliferation of the glandular conduits. These conduits entirely lined with epithelium in many layers which penetrated to vari-

(8) Jour. de Chirurgie, June, 1926.

PLATE XXVIII.



(Left) High power view of osmic acid preparation showing two cells containing small fat droplets.

(Right) High power view of osmic acid-preparation showing a collection of fat globules, surrounded by an area of fine fibrillar tissue. (The globules were not all in same plane so their shadows were more or less superimposed, and the large irregular areas of fat thus produced.)—Starry, page 481.

PLATE XXIX.

Hemangioma attached to right and lower segment of uterus. The broad ligament has been removed so as to show tumor proper. (Insert shows tumor proper, and point of attachment as it lay between folds of broad ligament.)—Wright, page 483.

ous depths, in the form of glands here, there papillæ or pseudopapillæ, elsewhere vegetations. The epithelium rested on a rather large layer of lax connective tissue, thicker externally and limited by unstriped muscle, clearly disposed in fascicles. Some conduits were branched. The whole structure, according to Seliga, proves the origin was in the Wolffian duct.

Hemangioma of Uterus is reported in a patient, of 38, by F. W. Wright[9]: Admitted Oct. 1, 1924, with "pain in pit of stomach," V-para. Her menses began at 12 years. They were regular, occurring every 28 days and lasting 4 to 5 days. The flow was moderate. Never had been any intermenstrual bleeding. The last period began Sept. 25 and last 4 days; normal in every respect. On examination cervix is normal. To the right and slightly posterior to uterus is a cystic tumor. It seems to move with uterus. The uterus proper seems to be normal in size. The pre-operative diagnosis was cholecystitis, cholelithiasis, and a tumor of pelvis. *Operation*—A mass, the projecting portion of which was 4 cm. wide, was found in right broad ligament. It was found to be very vascular and any attempt to separate it from uterus started marked hemorrhage. On further investigation found to form almost a part of the wall of uterus. A supravaginal hysterectomy performed, the tumor and the uterus being removed without disturbing their relationship. One ovary was saved. Several stones removed from gallbladder.

Pathologic report. The uterus is 6 cm. long and 5.5 broad at the fundus. On section musculature seems slightly thicker than normal. No myomata present. The cavity is normal in size. The endometrium is firm, granular, and everywhere intact. In the right broad ligament below tube and ovary and intimately attached to the right side of uterus is an oval mass 10.5 by 3.5 by 5 cm. It is bluish black, smooth and glistening. On section seems to be made up of large cavernous vessels

(9) Surg. Gynecol. and Obstet., September, 1926.

filled with coagulated blood. Microscopic examination shows large blood spaces filled with blood elements, the supporting structure being connective tissue forming trabeculæ. (Plate XXIX.)

[It would be interesting to know when she had her last child, and how much trauma was sustained in expression of the placenta; for the Editor has seen a similar tumor of traumatic origin.]

Bleeding Myoma. H. S. Crossen[1] states his working conclusions are—*(A)* If in a doubtful case excision of tissue from the cervix or intrauterine curettage is necessary to an early differential diagnosis, it could be carried out at once, without unnecessary manipulation of the growth, and the opened lymph spaces should be immediately closed by thermic or chemical cauterization. *(B)* The effort to limit such diagnostic excision or curettage to patients on the table and prepared for radical operation, is doing harm. It excludes from early differential diagnosis that large class of doubtful cases in which the local disturbance is very slight and the patient hesitates to go through the expense and mental strain of preparation for the radical operation on the mere chance there may be beginning malignant disease. And yet it is in just this very class that differential diagnosis is most effective in saving life. (The false impression referred to above is producing deaths by cancer not only by limiting diagnostic excision in the earliest stages but also by leading to repeated manual examinations and manipulation of the suspicious area in an effort to decide the diagnosis without tissue excision. Both reason and experimental evidence indicate that pressure manipulation of a cancerous area is much more productive of metastasis than simple excision of tissue with proper precautions.)

[The history is so suggestive in bleeding cases that repeated bimanual examinations can be omitted—when in doubt always trust the microscope. Only take biopsy

(1) Jour. Missouri State Med. Ass'n., September, 1925.

specimens with a keen knife, and seal all surfaces with electric cautery.—Ed.]

In résumé: The treatment for myoma with serious bleeding varies with the different types of cases as follows: 1. Where the myoma originates in the cervix or comes down into cervix from above, removal may usually be effected under morphin-hyoscin sleep with very little disturbance to the patient. However, the manipulation may start severe bleeding or extensive work may be found necessary to remove the growth. Consequently, efforts at removal and even deep examination should be postponed until the patient is in a hospital or otherwise prepared for any emergency that may develop. 2. A small bleeding myoma of corpus with patient in or near menopause may usually be most satisfactorily handled by radium with diagnostic curettage. 3. A small bleeding myoma of corpus in a younger woman is preferably taken care of by uterine astringents or curettage or, if found necessary, by myomectomy when conditions are favorable. In such a case radium and *x*-ray should be avoided because of their serious effect on ovarian function. 4. A large bleeding myoma of corpus in a patient near menopause is preferably taken care of by hysterectomy if the general condition will permit. If palliative measures must be employed temporarily, radium treatment with diagnostic curettage is the choice. If exceptional conditions make this not practicable, *x*-ray may be employed. When thus using *x*-ray, keep in mind that the question of complicating malignancy has not yet been settled. 5. A large bleeding myoma of corpus in a younger woman should be taken care of by removal —myomectomy if practicable, hysterectomy if necessary. Radium and *x*-ray are to be avoided in a young woman because of their destruction of ovarian function.

[Myomectomy should be more generally used on young women.—Ed.]

"Red" Myomas of Uterus. This type, so MM. Patel and Vachey[2] tell us, is an interstitial growth, hence of precarious vascularization, and liable to circulatory disturbances which account for the modifications in structure, and give it the peculiar appearance of dregs of wine or frozen meat. The histologic lesions are prin-

Fig. 40. Interstitial red myoma of uterus occupying fundus. (*A*) Red myoma; (*B*) Capsule; (*C*) Uterine cavity (Patel-Vachey).

cipally those of aseptic necrobiosis. All suspicion of malignancy or of infection should be rejected. The circulatory disturbances in question are due to various causes, among which pregnancy, labor, the menopause on one hand play a great part, and on the other hand, mechanical causes, *e.g.*, torsion of the uterus. Clinically it has the aspect of a uterine tumor, evidenced especially by acute pain, metrorrhagia, and a moderate rise of T. All symptoms which impel the patient to seek speedy relief. The only rational treatment is surgical. Pref-

(2) Lyon Chirurg., May-June, 1926.

erably—and without delay—hysterectomy which leads to complete and final cure. Hence this "red" type of myoma is a variety of evolutionary transformation which calls for a good prognosis.

[Thousands of these "red" tumors get well without radical surgery. After a few days the acute symptoms subside, the temperature and leucocyte count fall, and surgery may be delayed. When untouched cystic changes or calcification usually occur.—Ed.]

Cystic Degeneration of Fibroid, With Partial Extrusion. The patient, whose case is referred to by W. Edmond[3] was 46 years old, and admitted in severe shock, with signs of hemorrhage. She had taken an aperient the previous evening, and on waking early had found her "bowels lying out on the bed." The prolapse, consisted of a horribly putrid, grey mass, held together by interlacing fibrous bands. The external portion was clamped and excised. The uterus formed part of a hard rounded tumor extending up to 4 in. above umbilicus. At the upper margin a pedunculated fibroid could be felt. It was decided to perform hysterectomy. A considerable amount of clot and offensive serum was found among the coils of intestine; this was coming from the right tube, which was distended and had ruptured. The uterus was pale and edematous. In front it was adherent to peritoneum by recent- and to the omentum and transverse colon by much firmer adhesions. The omentum was tied off, but it was necessary to dissect peritoneum off uterus to free the colon. The veins of broad ligament very dilated, especially on left side. The small pedunculated fibroid on the fundus had undergone calcareous degeneration. One large interstitial fibroid showed typical red hepatization. The main portion however, was a large submucous fibroid, which had undergone cystic degeneration. This filled the cavity, and had sloughed; it was this mass that had been expelled.

(3) British Med. Jour., May 8, 15, 1926.

Edmond was afterwards able to get a more detailed history. The patient had had a child 19 years previously, but no further pregnancies. Menstruation had been regular, but during the last four years had been excessive, lasting eight days. She stated 13 months ago she passed a "fleshy lump." She had noticed enlargement of abdomen for two years, but had no inconvenience until a month before admission, when she was much troubled by backache and abdominal pain accompanied by a slight but very offensive vaginal discharge. There was profuse purulent discharge from the drainage tube, but T. became normal on third day; on the sixth it rose again slightly, and this was accompanied by pain and some swelling of left leg. This rapidly subsided, and all went well until 21st day, when she suddenly died of pulmonary embolism.

Large Fibromyoma of Cervix. This was successfully removed from a nullipara of 37, by F. Christopher[4]: She had always had regular menstrual periods every 28 days, lasting 4 to 5 days, with moderate flow and no pain. At the time of last regular period a profuse flow started and continued daily in moderate amounts for three weeks. Physical examination was negative save for the presence of a large mass (about the size of cocoanut) which could be palpated about 5 cm. above vaginal orifice. This tumor was firm, round, and covered with smooth vaginal mucosa. The cervix could not be identified. At operation, traction on the normal uterus showed tumor attached to the cervix but to be relatively immobile in the pelvic outlet which it practically filled. The tubes and round ligaments were separated from their attachment. The peritoneum was incised about the neck of uterus and a cleavage plane was found between tumor and peritoneum. It was not possible to continue the separation of this plane between tumor and vaginal mucosa so vagina was opened from above. The tumor and uterus then removed in one piece. The vaginal vault

(4) Amer. Jour. Obstet. and Gynecol., May, 1926.

was closed by a pursestring. Immediately after operation there was moderate shock, which responded to hypodermoclysis. On 10th day a sloughed portion of vaginal vault was passed. (Tumor 11.5x9.5x7.5 cm.)

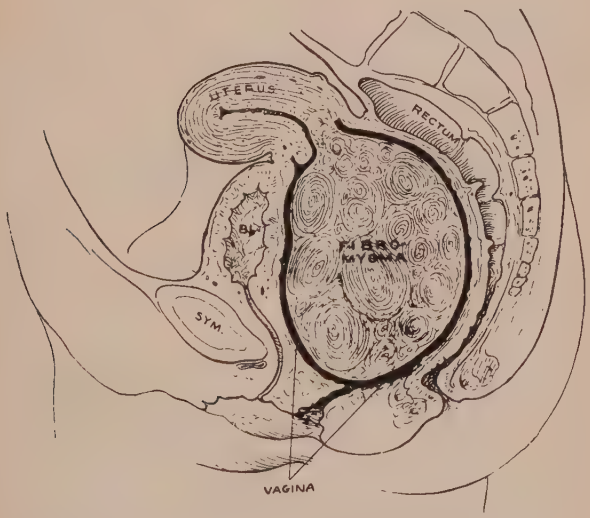


Fig. 41. Diagrammatic representation of fibromyoma of cervix. The peritoneum was incised posteriorly at the junction of the body of uterus with cervix, and an attempt made to find the cleavage plane between the fibromyoma and the vaginal mucous membrane. As might be anticipated, the plane actually entered was that between rectum and the posterior wall of vagina. This danger is to be guarded against in any effort to enucleate a fibromyoma of cervix from its mucous membrane covering by blunt dissection from above (Christopher).

Microscopically typical fibromyoma containing areas of edema with necrosis.

[Not particularly uncommon.—Ed.]

Treatment of Fibroids. Experience in 100 instances (62 white, 38 colored) is tabulated by W. C. Danforth[5]:

(5) Illinois Med. Jour., February, 1926.

CHARACTER OF TREATMENT

Operation....84	Laparotomy....82		
	Vaginal..... 2	Cervical myoma	
		Pedunculated submucous fibroid	
Irradiation....16			

OPERATION

Both ovaries retained	12
One ovary retained	22
Both ovaries removed	39

IRRADIATION

Successful relief from one treatment		14
Further treatment needed		2
Operation	1	
Bleeding decreased	1	

AGES OF RADIUM CASES (16)

30–40	40–50	50 plus
2	10	4

MORTALITY

Mortality of series	1%
Mortality of operative cases	1.18%

Some observations by E. A. Weiss on[6] *treatment of fibroids* are based on a comparative study of two 5-year periods. This shows (1) Their attitude is decidedly conservative in the uncomplicated cases. (2) When any complication exists, they heartily favor operation. (3) When the preservation of the maternal and sex function is desirable, myomectomy or resection is preferable. (4) The most favorable cases for irradiation are the bleeding variety. (5) The handicapped patients with diabetes, tuberculosis, cardiorenal disease, etc., are best treated with radium, at least as a trial. (6) curettement should be performed as a diagnostic measure in every instance before radium is introduced. (7) In patients younger than 40, radium should be used only with extreme caution to avoid causing a premature menopause. (8) Many fibroids may safely be kept under observation and operated on only if definite indications arise. Since using radium and very carefully observing all the contraindications to its use, their records show that during

(6) Amer. Jour. Obstet. and Gynecol., March, 1926.

the past five years a fair percentage has been so treated with very satisfactory results. However, they still adhere to the general principle that when in doubt, operation should be the procedure of choice. While no new line of thought has been presented by this study of over 1200 cases, yet they have endeavored to show that fibroid tumors are not to be necessarily relegated to operation, especially radical treatment. At the same time operative mortality and morbidity can be very definitely reduced by the judicious employment of radium when used alone or as an adjunct to surgery.

In the discussion, J. O. Polak said: "I don't know of anything which has been presented to any society that is going to carry so much weight as this excellent paper of Dr. Weiss'. When we look at 1200 cases and see an analysis so honest as that, we can't help but be impressed with the fact that it means something, and to the thinking man carries something with it. The whole point about the use of radium versus operation is this: The diagnosis and the type of tumor. Radium will not cure subperitoneal tumors. Radium will do harm to the submucous pedunculated tumors. We have to have a tumor that has a diffuse circulation from the intramural wall to get our best success with radium.

"One clinical point, too, is of very great importance, and that is how to handle these cases. We never promise these patients what we will do. We don't know until we have the patient under the anesthesia and have done our preliminary exploration of the uterus whether we can use radium or whether hysterectomy will be necessary; we don't know until the abdomen is opened whether we will do a myomectomy or a hysterectomy. Patients should be taught to put sufficient trust in us to allow us to make the decision in order to do the best work.
been doing partial resections of the uterus much more frequently lately, rather than hysterectomy. Ordinarily

"I don't know of anything that makes a woman so happy as to realize that she is not unsexed. We have

it is a question of a healthy cervix, but now we do not worry so much about the cervix because we can cure an endocervicitis. We have been resecting the upper portion, leaving as much mucosa as we can and leaving one or both ovaries, and the patients are very happy.

"Radium will cure dysmenorrhea in many of these very marked multiple fibroids without stopping the menstruation and without the necessity of the woman losing her uterus.

"I have for a long time been advocating removal of the cervix in hysterectomy on account of the incidence of cancer. The last few years we are trying a new scheme to see how it will work out. We are coning out the cervix with a very sharp knife so that nothing is left but a rim of partial mucosa and before the patient leaves the hospital we leave 50 milligrams of radium in the cervix sometimes for ten hours or so, and are trying to see whether we will get the same incidence of cancer that we found in the previous analysis of our cases."

Myomectomy for Fibroids. This is the operation of election, so V. Bonney[7] asserts: Conservation of uterus should be the ideal aimed at whenever the uterus, apart from the fibroids, was reasonably healthy. He reported a new series of 120 consecutive myomectomies in the last three years. A single tumor was removed in 47 cases; in the remaining 73 the tumors were multiple, the greatest number at one operation being 80. In the new series myomectomies he had had 3 deaths, and in his first series of 100 cases 2 deaths, so the mortality for the 220 operations was 2.2. The difficulties of the operation, as practised on a wholesale scale, would be largely circumvented by the experience from increasingly widespread adoption. It had been objected that new fibroids would probably develop, but this was a bogy. It had also been objected that menorrhagia might persist in spite of the removal of the tumors, but this was equally unlikely. He had never yet had to operate a second time

(7) Lancet, Nov. 21, 1925.

for continuance or reappearance of excessive bleeding. It had been argued that the uterus from which a number of fibroids had been removed would be functionally useless. This also proved to be fantastic. A number of the patients on whom he had operated had subsequently became pregnant, and the idea that the conserved organ

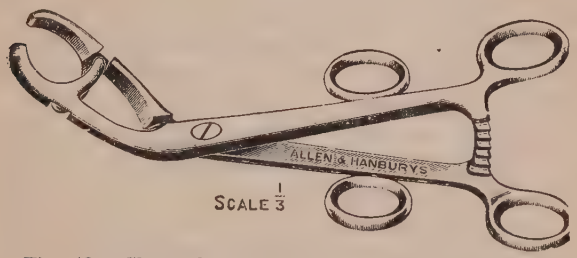


Fig. 42. Clamp for myomectomy. This acts as a tourniquet applied to the lower segment and controls both uterine arteries at once, so when the ovarian vessels are temporarily compressed by a ring forceps on either ovariopelvic ligament the circulation through uterus is entirely stopped, and operation becomes bloodless. This is an immense gain, for it not only renders many myomectomies possible which previously were impossible, but in all these operations it permits the surgeon to proceed with the enucleation and subsequent reconstruction of the uterus unhampered and unhurried by the constant oozing which was the chief difficulty previously. The clamp is applied from the front through the lower end of the abdominal wound, and *it is important to put it in so that both round ligaments are included in its grasp,* for otherwise it may slip down the cervix below where uterine arteries enter uterus. As the enucleation is proceeded with and the uterus shrinks it may need tightening up a notch or two, or even readjusting, and where the supravaginal cervix contains a fibroid this must be enucleated before the clamp is applied. It should not be taken off until uterus is completely sutured. On its removal the organ temporarily flushes up just as a limb does after a tourniquet is removed and some oozing may start from the suture holes. This usually stops as the flush subsides, but any point that persistently bleeds must be underrun with a mattress suture (Bonney).

would probably be an incubus to its possessor could be dismissed. Bonney illustrated the beneficent possibilities by describing cases in which, in spite of the presence of many tumors, or of tumors in difficult situations, he had been able to send the patient home, not only cured, but whole and normal. This was an enormous improvement compared with hysterectomy, where removal of the

tumors was counterbalanced by the loss of an organ which had other uses besides that of child-bearing. The removal of the uterus inflicted on most women a severe psychologic injury. The aim of all treatment should be, not merely to remove disease, but to leave the patient normal, and any method which failed to achieve this end was obviously second-rate. It was now possible in practically every case of fibroids to conserve the uterus, and he hoped to see the time when every surgeon called upon to operate for that condition would enter upon his task with that conception in the forefront of his mind.

[It must be recognized that but few surgeons have the technical skill and mechanical genius of Mr. Bonney—and while we agree in principle, we can't encourage the average surgeon to do multiple myomectomy.—Ed.]

In the discussion, A. Giles[8] said he was convinced that myomectomy was valuable, and probably not used as often as it might be. He had always been greatly interested in the operation, which he had first employed in 1899, and had so far performed 203, with 3 deaths. He differed from Bonney mainly as to the scope, and considered it was seldom advisable over 40 years. The chief aim was to preserve the uterus for child-bearing, and when this was virtually out of the question the purpose of the operation was gone. It could be admitted that the uterus had some influence over the ovaries; but after 40 this was unimportant. His desire to limit the scope was based on several considerations: first, the mortality. Bonney recorded a mortality of 2.2, and said that of hysterectomy was 2.5 per cent. He could not agree to such a high figure; in his last 1000 hysterectomies for benign conditions there was a mortality of 0.6. Then there was the question of recurrence. If every seedling fibroid was removed during a myomectomy the chance of recurrence was very small, but this would involve microscopic examination of the uterus, and though Bonney might have had no recurrence it was quite possible

(8) British Med. Jour., Nov. 21, 1925.

he would meet with some when more time had elapsed. Giles felt strongly, therefore, that when child-bearing was out of the question hysterectomy was the better. As to myomectomy during pregnancy, he had seen 18 cases; one miscarried, the others went on to full term. From one who went to term he removed 10 fibroids. He had never had occasion, however, to remove the pregnancy as well as the fibroids; the whole object of the operation was to preserve pregnancy, and, if there was any likelihood the operation would entail sacrifice of the fetus, he would prefer to perform a cesarean at term, dealing with the fibroids at the same time.

[Excellent conclusions to which we may subscribe.—Ed.]

Twelve operations are recounted by P. L. Giuseppi[9]: The number of fibroids removed were: 19, 17, 13, 11, 8, 6, 6, 1, 1, 1, 1, 1. The time taken at the operation is important; the shorter the time the less the shock, and the more fibroids can be removed. His times have been 22, 30, 25, 28, 20, 30, 21, 25, 28, 18, 39 (when an appendectomy was also performed), and 25 minutes. The patient from whom 19 fibroids were removed has had one baby; the one with 13 fibroids has had two children; one with one fibroid has had three children; and the one with 17 fibroids became pregnant but had eclampsia. He had in series one cervical fibroid which weighed over 2 lb., and in one case removed a large fibroid with red degeneration at the 4th month of pregnancy. The woman was taken with acute pains. The uterus reached nearly to the ensiform and was very tender. The tumor shelled out very easily; it weighed over 2 lb. The pregnancy was not disturbed and the patient has since had two other children. Myomectomy is the correct operation, not, it is true, for all fibroids, but for a very large number for which hysterectomy is done today. It seems but reasonable that an operation with so low a mortality, cures the symptoms in so large a proportion, and per-

(9) British Med. Jour., Dec. 26, 1925.

mits continuation of child-bearing, especially in these days when children are so badly needed by the nation, should become the choice in the not distant future.

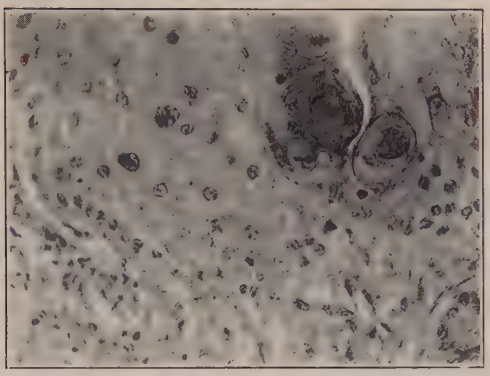
[Good reasoning, and I would say good luck.—Ed.]

Conservation of Uterus in Surgery of Fibroids. Concerning this topic, C. J. Miller[1] writes that myomectomy is the possible treatment in 12 to 14% of all fibroids. It is contraindicated in multiple large growths, in degenerating growths, and in the presence of associated adnexal disease. It is always indicated, when it can be done, under 40. After that age it need not be the routine unless the patient expressly desires it. Eighty-five to 90% of patients menstruate normally afterwards, and in those who do not, or in whom the growths recur, irradiation will usually be possible and a second operation avoided. Twenty-eight to 30% conceive after myomectomy. The single subperitoneal or interstitial growth gives most satisfactory results, but multiple growths of all types may be safely removed provided a careful technic is observed and perfect hemostasis secured. The abdominal route is the more satisfactory, and the best time immediately after a menstrual period. The average patient with fibroids will deliver normally at term without previous operation, but myomectomy on the pregnant uterus can be done, if indicated, without interrupting pregnancy.

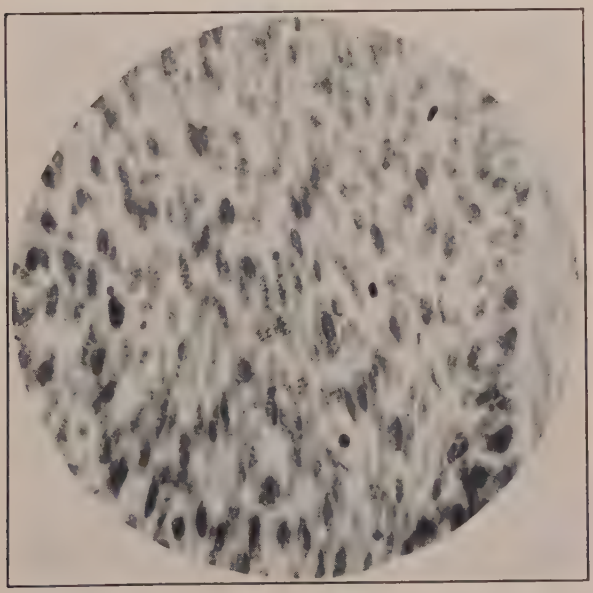
[Miller's contraindications and indications should be emphasized.—Ed.]

Cervical Cancer. The variations in malignancy of the different varieties are pointed out by K. H. Martzloff[2]: His data have been gathered from 387 patients in Johns Hopkins Hospital prior to 1920. This figure includes only *complete records together with all pathologic material.* Of this number the table shows the number traced and their distribution as to operability. "Operability" is used here to indicate whether or not the

(1) Southern Med. Jour., February, 1926.
(2) Northwest Med., March, 1926.



High power view showing epithelial "pearls" at upper right hand To left of pearls are typical spinal cells with well-defined cell membrane, polyhedral outline, and much pale eosin-staining cytoplasm.



Fat spindle-cell cancer, showing cells with broad and elongated nuclei, closely placed and with little intervening eosin-staining cytoplasm.—Martzloff, page 496.

patients were considered to be within the scope of a possible operative cure and were, therefore, subjected to

TABLE I.

Showing the number of patients operated upon and traced in this series.

Total No. operated upon.....	290	Total No. inoperable.....	97
Operated upon but not traced....	87	Inoperable cases not traced.....	43
Operated upon and traced 203 or 70.2%		Inoperable cases traced 54 or 55.1%	

Total number traced—257 or 66.3% of 387 cases.

an operative procedure. The figures in Table I do not, therefore, give a true index of the actual operability of the cases in this study.

TABLE II.

Showing the relation of broad ligament involvement to the thickness of cervix involved in cancer, where ⅓ or more of cervix is so involved.

Thickness of cervix involved in cancer	Number of cases	Number of cases of bd. lig. involvement	Per cent of cases with bd. lig. involvement
One-third to one-half.....	20	3	15% of 20
One-half to two-thirds	15	3	20% of 15
Entire thickness.....	189	114	60.3% of 189
Total.....	224	120	53.6% of 224

The cells seen in epidermoid cancer of cervix fall morphologically into three large groups: transitional, fat spindle and spinal cell groups. Secondary involvement of the corpus in cervical cancer occurred in 41.3% when the entire length of cervix was involved. One-third of all patients seen during the first 6 months of symptomatic disease, with the exception of those suffering from the spinal cell type of cancer, had extension to the broad ligament. Less than 10% with such involvement lived more than one year after operation. In 97% some form of unusual vaginal discharge (either bleeding or leucorrhea) was the primary symptom. Of this series 52.1% occurred between 36 and 50 years inclusive. Of the patients between 31 and 35 inclusive, 18.6% are well today. This is the highest "cure" incidence for any five-year age-period in this study. Of these patients 5.4 gave a history denying pregnancy at any time or any form of vaginal instrumentation.

The total operability of the cases in this study is 46.5%. The total operative mortality in this series is 14.2%. The operative mortality prevailing in this clinic at the present time is between 6 and 7%. Preliminary curettage performed several days prior to the radical operation was employed in 36.8% of the patients now in good health. From this they would conclude that a diagnostic curettage not immediately followed by a radical operation does not by any means render the prognosis hopeless. The incidence operated upon and traced who are well today is 18.7%. The incidence of so-called "five year cures" is 26.6%. The histomorphology of the predominant types of cells indicates the relative malignancy. In this study the *spinal* cell type proved to be least malignant. The *transitional* cell type is next and the *fat spindle* cell type most malignant of all. The adenocarcinomata, as far as relative malignancy is concerned, fall in between the spinal- and transitional cell groups of epidermoid cancer. (Plate XXX.)

[Until we all accept one grouping it will be difficult to give full credit to results. In this series we would feel that operation was selected in cases that would properly fall in group 2 and belong to radium therapy—also that the operative mortality was too high.—Ed.]

The "Malignancy Index" in Cervical Carcinoma. Schmitz, Hueper and Arnold[3] dwell on the significance of this in prognosis and treatment: The cell types, the differentiation, and the anaplastic changes have been studied. They were given a numerical value, the sum representing the histologic malignancy index. Immaturity of the cells, a low degree of differentiation and a high degree of anaplastic changes are invariably associated with a high index. The greater the maturity of cells, higher the differentiation and the less the anaplastic changes are, the lower will be the index. The clinical malignancy of a carcinoma depends solely on the results

(3) Amer. Jour. Roentgenol., July, 1926.

of treatment obtained, provided the same method was used in each case. The extent of the carcinoma influences the outcome then, only if it has thereby become a generalized disease (Group 4 cases). A carcinoma contained within a well-defined area and having a low index offers every hope for a relatively good prognosis.

Comparing the histologic malignancy index with the clinical grouping of the carcinomas and excepting the Group 4 cases, it is found that a definite relation between the two does not exist. The relation of the cell type to the histologic malignancy index is definite. The unripe cell type is almost always associated with a high index. The relation of cell type to the clinical result is not as definite as the relation of the malignancy index to the clinical result. The index shows a proportionate relation to the result of treatment obtained. Considering the relation of the index to the clinical result and excluding the Group 4 cases, we may conclude that the pathologist can give definite information as to the degree of malignancy from a histologic examination expressed in numbers of the malignancy index, which will enable the clinician to choose those cases which may respond with fair prospects to radiation treatment.

[We believe in the index, but to interpret this well we need pathologists who are also clinicians.—Ed.]

Sympathectomy for Pain in Inoperable Carcinoma was done by G. Tisserand[4]: The patient, aged 47, had an inoperable cervical cancer and had had two applications of radium at intervals of 2 months. Some 3 months afterward, she returned with very severe pain, requiring almost constant use of morphin, and profuse hemorrhage. Extensive sympathectomy was carried out on both hypogastrics, the pain and hemorrhages ceased, and until death 8 months later, no further pain.

In the discussion, R. Leriche said that in neoplastic invasion of the pelvic lymphatics the pain is more often due to compression of the vessels by the lymphatics

(4) Lyon Chirurg., September-October, 1925.

rather than compression of the nerves. He operated under these conditions on 2 occasions. (I) Pelvic pain after radiotherapy of cervical cancer. Excellent result after sympathectomy on both hypogastric arteries. (II) Cancer of prostate, Leriche believes that in treatment of pelvic pain from cancer, one should prefer, at least in beginning, periarterial sympathectomy to indirect interventions on the nerve trunks and cord. The sympathectomy is not to be confined to the hypogastric artery, but carried as high as possible on common iliac and aorta.

[Tying the hypogastrics and the accompanying nerve ganglia have relieved pain in several of our cases.—Ed.]

Cervical Carcinoma at 26 Years. The patient seen by L. W. Frank[5] was married at 15, and a year later gave birth to child. About year previous began having metrorrhagia, and a few months later intermenstrual bleeding was noted. When first seen examination disclosed a left-sided cervical laceration which extended up into vaginal mucosa. There was also considerable cervical ulceration. At the examination there was marked ulceration of both anterior and posterior cervical lips extending up beyond the os, and finger could be easily introduced to fundus. There was considerable infiltration of left broad ligament. A small piece was submitted to pathologist who reported an "epidermoid carcinoma of the cervix." Among 300 patients with cervical carcinoma seen during the last seven years, 5 or 6 were in the early thirties. A few were 28 or 29. Frank has seen one cervical carcinoma in a pregnant patient, of 22, who was treated with radium. She was delivered at term of a healthy child, and was living in good health two years afterward. He is using radium in the case reported and hopes for a good result. The infiltration in the broad ligament makes the outlook somewhat unfavorable, but this may be purely inflammatory.

(5) Kentucky Med. Jour., March, 1926.

[The youngest case we can find in the literature was 18. The malignancy index is usually very high in young women.—Ed.]

Metastases From Cervical Cancer. At the Paris Surgical Society, J. L. Faure[6] gave 3 reports corroborating the belief that such metastases are not as rare as has been thought: (I) Cancer of kidney, 2 years' postoperative. A short time prior, local recurrence treated by radium. (II) Radium treatment first, then operated on. Metastases to thigh and brain. (III) Condition almost inoperable, curetted, next radiumtherapy, then operated on. Recurrence in sternum year later. He pointed out that such cases were almost unknown before the use of radium. However, he believed radium was a precious means of turning inoperable- into operable cases. The intervention should be free, and care taken to avoid secondary infection, preferably by the Mikulicz drain.

Cervical Carcinoma and Venereal Disease. During the 7 years R. Nicholson[7] has had charge of two clinics for veneral disease, some 3 cases had been found in 1500 patients: (I) Age 25. First seen in 1919, when being treated for syphilis. She was also suffering from a chronic urethritis and endocervicitis, and though at the time gonococci could not be demonstrated in the discharge, later she developed salpingitis, and gonococci were then definitely shown. The treatment for syphilis was continued, and local applications of protargol and glycerin were used for cervix for 5 months. She came again in 1921, with a recurrence of vaginal discharge; there were then no signs or symptoms of carcinoma. December, 1923, came complaining of intermenstrual hemorrhage of one year's duration. Miss Ivens performed hysterectomy. The pathologic report was "a squamous-celled carcinoma." She was still alive, 27 months later, but the malignancy had recurred.

(6) Gaz. des Hôpitaux, April 3, 1926.
(7) British Med. Jour., May 1, 1926.

(II) Age 40. First seen in 1921, with well-marked signs of secondary syphilis and a positive Wassermann. No primary chancre was discovered. No signs of gonorrhea at that time, and smears were negative. She was treated for syphilis, and had had a negative Wassermann and no clinical signs for 2½ years. In February, 1924, returned complaining of slight frequency of micturition. Vaginal examination revealed an irregular growth of cervix, which bled readily. There was a warty growth arising in cervical canal, and the section showed a luxuriant papillomatous growth originating from the columnar epithelium, which did not invade the stroma of cervix, and therefore might be considered benign. The cells, however, were multilayered, actively proliferating, and irregular. These facts, in conjunction with the microscopic appearances, were in favor of malignancy. The closed adherent tubes showed a gonorrheal infection was also present, and an interesting fact was that a year after, on resuming marital relations, she developed acute urethritis and vaginitis, gonococci being demonstrated in smears from both orifices. She was at present, two years after operation, apparently free.

(III) Age 50. Sent to the venereal department in June, 1925, suffering from tertiary syphilitic ulcers of the thighs, and the Wassermann was positive. Urethritis, vaginitis, and endocervicitis were also discovered, and gonococci found in the smears. A subtotal hysterectomy had been performed four years previously. This patient had had intravenous injections of neokharsivan and local treatment for the gonorrhea 2½ months. She had ceased to attend in September, and returned in February, stating she had been suffering from neuritis of the arm, but no discharge or hemorrhage. Miss Nicholson saw a small cauliflower-like mass, which bled readily; the section showed a squamous-celled carcinoma.

Miss Nicholson said that in each the gonorrheal infection with its accompanying cervical discharge might have been a predisposing factor in the production of

cancer. In Cases I and III local treatment might have caused further irritation. It was, of course, a possibility that the primary chancre occurred upon the cervix in these cases, as it was not seen anywhere else. The youth and nulliparity of Case I were unusual with carcinoma, and so made it more probable that venereal infection might have been a factor.

[Chronic cervicitis with erosion is often a forerunner of cancer. Bonney has stated that all cervical cancer is preceded by erosion.—Ed.]

F. J. McCann[8] *points out* that in his work on "Cancer of the Womb," discussing the relationship of venereal disease to cancer, on page 17 it is written:

"Syphilis is held by some to play an important part, but there is no well authenticated proof that it does so in the uterus, as cancer does not appear to be more common in those who have contracted syphilis. There is more evidence in favour of gonorrhea as a predisposing cause of cervical cancer, for by the production of chronic cervical gleet it favours those cell changes which lead to cancerous formation. I have met with several cases in which the relationship was clinically established."

McCann has seen and described cervical cancers where the manifestations of syphilis were in the tertiary stage, but whether or not the primary sore was in the cervix could not be determined. He also pointed out (*ibid.*, p. 52) that a primary cervical sore is not rare. This statement was challenged by some critics, but Fournier's statistics show that of 249 genital chancres in the female 13 were cervical. McCann has not yet seen a cervical gumma, but a photograph (*ibid.*, Plate xiii) represents a cervical cancer removed from a patient with tertiary syphilis. Whether her syphilis predisposed to the cancer could not be determined. It is unfortunate that the venereal clinics for women have been separated from those devoted to gynecology, for the importance of venereal disease as an etiologic factor in the diseases of women is apt to be overlooked or misinterpreted. The relationship of venereal disease to cervical cancer is

(8) Ibid., May 22, 1926.

much more likely to be determined by a study of the women seeking relief for cancer in the gynecologic clinic than by a study of those seeking relief for venereal disease in whom cancer is accidentally discovered.

[Venereal diseases in the female should be seen and treated in the gynecologic clinic.—Ed.]

Cervical Cancer in Prolapsed Uterus. L. Murray[9] describes a case and states it seems to be very uncommon. It was his first case, and the 2nd seen by him: A woman, aged 43, IV-para, gave a history of moderate and not very troublesome prolapse for some years; last birth eight years previously. She had been under treatment for pulmonary tuberculosis for two years, and was considered to be holding her own; she had not recently lost weight. Her cough, however, was troublesome, and to this was attributed an aggravation of the prolapse a few weeks before. During those weeks there became apparent for the first time, so she stated, a protrusion at vulva, which bled readily and almost continuously, and was associated with considerable pain in pelvis and a tendency to retention of urine. She asserted that menstruation had been regular, but scanty, until two months previously; since that time there had been a good deal of blood-stained discharge, with latterly an objectionable odor. Patient was thin, but in no sense wasted. At the vulva there was protrusion, about 2¾ in. long, of sloughing, infected, friable carcinoma; it bled readily to the touch, and appeared to be freely movable. In view of her tuberculosis and the grossly-infected cervix, it was considered best to recommend a quick amputation of cervix, followed by radium. The bladder was separated with some difficulty, but was not definitely invaded by the growth; the difficulty appeared to be due to cellulitis resulting from secondary infection. During the operation the peritoneum was accidentally opened, and a vaginal hysterectomy was substituted for the original intention. The patient made a good recovery from the oper-

(9) British Med. Jour., May 1, 1926.

ation, and underwent prophylactic radium treatment. There was no recurrence of vaginal bleeding, but, as Murray did not have an opportunity of examining the patient after operation, he was unable to state whether symptomless recurrence developed. She died 21 months later, apparently from the lung condition. Sections even of the deepest part of growth showed intense infection of a very active squamous carcinoma of rather unusual type. Clumps of cells appeared to lie in pseudo-acini, and had in places a margin that might almost be described as "palisade." There was, however, no further resemblance to rodent ulcer, and the type of cell was very different from that found in this disease.

Commenting on this, N. A. Macleod[1] observes procidentia is practically confined to women who have borne children—not so much to those who have had hard labors as to women who have had successive pregnancies so rapidly the uterus has never had time to get back to its normal post-partum size. Carcinoma of the cervix is also admittedly most common in women who have borne children, especially where the cervix has been lacerated. Yet these conditions, individually common in the same class of case, very rarely coexist. It seems, therefore, that cancer is less liable to develop in the prolapsed cervix than in the non-prolapsed, otherwise the associated condition would be more frequent. Perhaps the character of the epithelium changes, making it less liable to a proliferative change. The following two cases may be worth recording. The first one shows carcinoma associated, and the second, carcinoma developing soon after a long-standing prolapse was rectified:

(I) On July 22nd, 1922, called to see a widow, aged 72, VI-para, who complained of pain. Whilst palpating the abdomen he found that the uterus prolapsed for about 3 in. outside the vulva. The cervix was a fungating, foul-smelling, cauliflower-like mass. She admitted that, although the prolapse was of 30 years' standing,

(1) Ibid., July 3, 1926.

the actual ulceration had existed for only two or three months. Vaginal hysterectomy Aug. 26th. She remained quite well until Sept. 20, 1924, dying of cardiac disease, having shown no recurrence of carcinoma. (II) Aged 53, IV-para, the youngest aged 26. Her prolapse dated from soon after last confinement. No sign of old laceration, but there was a certain degree of superficial soreness of cervix due to friction. The uterus could easily be replaced but not retained in position. She was admitted to hospital, and the inflammation of cervix rapidly disappeared with rest and local treatment. An operation for perineal repair, along with ventral fixation, was decided upon, and this was performed on Jan. 28th, 1914. She enjoyed perfect health, and was most comfortable for 20 months. She then removed out of the district, but came back early in 1917 complaining of a sanguineous vaginal discharge of two months' duration. Examination revealed inoperable pelvic carcinoma, apparently originating in the cervix.

[I have never seen cancer of the cervix develop in complete procidentia. The prolapsed tissues become resistent from exposure and when ulcer occurs the woman sees it, becomes alarmed and has attention before cancer develops.—Ed.]

R. H. Paramore[2] states that in patients near the climacteric with prolapse he amputates the cervix as high as he can, slits up the anterior vaginal wall, separates its lappets from the prolapsed part of the bladder, cuts through into the vesicouterine pouch of peritoneum, pushes up bladder, and brings down uterine body. He next pushes a knife through fundus, at the summit of uterus, into the uterine cavity, cuts away most of the anterior uterine wall, so one has exposed the endometrium lining the posterior uterine wall, and at the sides of this shelving stretches of the uterine wall. The endometrium of the posterior wall is then removed, bleeding vessels secured by under-stitching, and the remnant

(2) Ibid., July 31, 1926.

of uterine body stitched to the anterior vaginal wall, which is sewn up after its redundancies have been excised. It is a modified interposition operation. A small posterior colpoperineorrhaphy, in which the levator borders are brought together, completes the operation. He did this modified operation—which must disclose any present carcinoma and prevent the rise of any future one from the endometrium—for the first time on Dec. 10th, 1923. The patient was 50, and had complained of bearing-down pains for 16 years and had had the prolapse protruding for four years. When first seen she had had bleeding for ten weeks without intermission. No carcinoma was found.

Carcinoma-Incidence After Supravaginal Hysterectomy. A series of 1114 operations (N. Y. Woman's Hospital) reviewed by S. S. Hochman[3], showed but 3 instances of malignancy of cervical stump. In 263 cases of carcinomas of cervix, 7 had had a supravaginal hysterectomy for a nonmalignant condition, at which time, 4 of the 7 were most likely coexistent, leaving only 1.14% truly subsequent cases of carcinoma. In 377 operations with coning out of the cervix, 1 developed carcinoma of the stump. In 595 operations with carbolization of the stump, 2 developed future malignancy. Coning out of the cervix helps prevent future infection, and in a great measure, future carcinoma of cervical stump. This takes no more time than carbolization, which does not even prevent infection, much less cancer, and should be adopted as a routine in supravaginal hysterectomy. The occurrence of carcinoma in the stump of cervix does not warrant a panhysterectomy with its much greater mortality. In the above series, 1111 cervices would have needlessly been removed with the loss of the keystone of the arch and complications resulting from a disturbance of pelvic anatomy. Moreover, even panhysterectomy does not give assurance of freedom from future malignancy. Where a definite pathologic

(3) Amer. Jour. Obstet. and Gynecol., April, 1926.

cervix which is lacerated or infected—especially where discharge is present, exists at the time of the supravaginal hysterectomy, it should be removed then or as soon as possible. All cases after a supravaginal hysterectomy should have an adequate follow-up system with definite periodic examinations for any changes in the cervix and for any history of bleeding or discharge. This is extremely important for the early detection of carcinoma, with favorable prognosis by early treatment, especially radiation. A very careful examination should be made of the cervix at the time of operation (hysterectomy) to decide whether the cervix should be removed with the uterus, and if not, in all doubtful cases, a sufficient amount should be excised for pathologic examination. This is especially important where any degeneration or necrosis exists in the uterus. There is a definite relationship between myoma and carcinoma of the uterus.

[This study has shown that there is a definite incidence of cancer in the conserved cervical stump. Also that it is all-important to study the condition of the cervix before electing operation.—Ed.]

Cervical Cancer After Subtotal Hysterectomy. M.M. Jeanneney and Chavannaz[4] met with a carcinoma of cervix, 6 years after subtotal operation for fibroma. After a study of the various case-reports they believe cervical cancer is no more frequent after operation than in patients not subjected to intervention. Also, that by examination of the cervix at time of abdominal hysterectomy a decision should be reached as to whether total- is preferable to subtotal method.

In the discussion, P. Lecène said cancer can develop in the scar of a total hysterectomy, as well as when cervix is left.

J. L. Faure remarked that the subtotal operation was less dangerous, and should not be abandoned on account of the rare occurrence of cancer in the stump.

(4) Gaz. des Hôpitaux, April 3, 1926.

Recurrent Cervical Cancer After Hysterectomy, Local Cure for 2 Years by Radium. The details of this interesting case as given by MM. Bérard and Guilleminet[5] are that the patient was operated on in January, 1923, in December, a reddish discharge appeared with pelvic pain. Examined by Bérard, in January, 1924, when a mass of vegetations was found at base of vagina, general condition rather good. Four tubes of radium (62 millicuries) applied to lesion for seven days. When discharged, Feb. 15, local lesions nearly entirely absent, as well as discharge and pain. Up to June, 1925, condition satisfactory though on two occasions there was gastrointestinal disturbance with vomiting. Then woman noticed a mass at umbilicus, which slowly increased. Readmitted, January, 1926, tumor at umbilicus size of mandarin, somewhat mobile, not tender. General state only mediocre. Operation (Jan. 21) showed neoplastic mass adhering to lower aspect of umbilicus and embedded in omentum, also invading middle of transverse colon, for about 1.5 in. Colectomy, operative recovery. During the intervention it was seen there were no evidences of recurrence in vagina, broad ligaments, nor parametria.

Cervical Carcinoma Following Posterior Division. B. Solomons[6] showed a specimen of carcinoma of the cervix following posterior division, and a uterus he had removed by Wertheim's method from a patient, aged 46, married 26 years, sterile. For the past year and a half menstruation was irregular, but general health was good. Posterior division of cervix had been done some years previously. Solomons said he had condemned this operation in any form for many years.

[There can be nothing causative in posterior discission of cervix, except that it is often followed by erosion—and erosion many times precedes cancer.—ED.]

(5) Lyon Chirurg., May-June, 1926.
(6) British Med. Jour., June 26, 1926.

Endothelioma of Uterus. A series of 9 specimens were studied by K. Ulesco-Stroganova[7] (3 of body, 6 of cervix): The differences are so marked, a division into these 2 groups is justified: The endotheliomata form a well-marked entity, distinguished by a preponderance of cells from the endothelium and small vessels. The growth resembles an epithelioma or a sarcoma, according to whether the cells from endothelium or from connective tissue predominate. The polymorphism of such neoplasms is explained by the power of modification of the cells from the endothelium and the adventitia. The author suggests the following classification: 1. Endothelioma carcinomatodes. 2. Endothelioma sarcomatodes. 3 Endothelioma sarco-carcinomatodes. 4. Angio-endothelioma.

Sarcoma of Uterus. Operation was done on a patient, of 27, by J. C. Bunden[8]: Age 27, complaint of some loss of strength for previous 3 weeks. Last child, January, 1921. Return of menses 6 weeks later, discharge April 17-26; May 4-9; May 26-June 6; then Sept. 23-Oct. 13; profuse metrorrhagia with moderate leucorrhea in intervals. Abdominal examination disclosed nothing abnormal. Vaginal touch showed old laceration of perineum and bilateral of cervix. Uterus retroverted, bloody discharge from cervix. Adnexa not tender. Fundus seemed abnormally hard and a little irregular. Fibroma diagnosed. Oct. 13, hysterectomy; recovery. Histologic examination disclosed sarcoma in an early stage.

Treatment of Uterine Cancer. At the International Surgical Congress (1926) S. Forsdike (London)[9] said he had had occasion to care for 197 patients: Seven seen early, were treated only by *x*-rays and radium, six still living without any evidence of return for 56 months, (two), 46 months, 28 months, 22 and 13 months, respectively. In 50 others more advanced, irradiation was followed by a Wertheim. In 40 recurrences after the Wertheim, the most to be had was temporary improve-

(7) Archiv f. Gynäkol., July, 1925.
(8) Surg., Gynecol. and Obstet., October, 1925.
(9) Gaz. des Hôpitaux, May 1, 1926.

ment. Lastly 100 advanced cases were also irradiated. He believes as a result of this experience, that whenever apparently operable the radical intervention should be done. However, all patients are first subjected to *x*-rays and radium, and these are continued for a month post-operative. While deep *x*-ray therapy is very popular he does not feel authorized to advise it as the choice.

In the discussion, M. Robineau reported the results with radium in Degrais' service: Of 114 patients seen in previous 3 years, 112 were treated, two could not support the technic. The plan of small doses at short intervals with numerous foci gave good results. The doses and duration of treatment should be proportioned to the extent and nature of the lesions. From 23 to 28 millicuries have cured certain individuals for many years, some of them 12 and even 16. Robineau praised preoperative application of radium, which cleans up the cervix, but a wide hysterectomy must be done removing the nodes. Radium after operation is only useful when operation has been incomplete or there is recurrence.

Out of 117 patients seen by P. Begouin in previous 7 years, 7 were inoperable when first examined. Regaud's technic was used. Begouin pointed out that recurrence in one seemed to take place at end of 4th year, the others were apparently cured, though one had a recurrence after 1st year, and radium again led to definitive cure.

J. L. Faure observed that in favorable instances operation seemed to him to give better results, for the 5-year cures were 75%, instead of the 25% for radium given by Regaud. He would restrict radium to cases of limited extent, or infected, here the advantages of radium surpasses the risks of lighting-up the cancer cells, risks which must not be overlooked.

B. Proust was of opinion that treatment should be governed by the juxtauterine lymph invasion inside uterus, total extent of the broad ligament or lastly, of

the uterosacral ligaments. Invasion of the outer portion of broad ligament is a contraindication to operation. The action of radium is valuable for uterine- or juxtauterine lesions, but where cancer involves the outer part of broad ligament the vaginouterine route is insufficient. Very partial to irradiation kept up as long as 3 weeks in radioresistant growths, he makes use of the index of karyokinetic activity to determine the length of treatment. Four years prior, Proust had used radiumtherapy, during 1922 some 64 patients were treated, 16 still in good health. He has the impression that surgical cure is more lasting than that by radium though one must operate in healthy tissue not yet invaded; if impossible one cannot obtain long survivals.

Since 1920, a series of 75 cervical cancers were treated at Gosset's clinic, and were referred to by M. Sabrazes: They were all of epithelial type verified by histologic examination, and in general considered inoperable. They were treated by radium according to Regaud's method, then total hysterectomy after 4 to 6 weeks. As a result of the radium applications, hysterectomy was possible and even simplified, in 69 hysterectomies there were 4 deaths, none followed after 32 Wertheims. Hysterectomy must be wide, for the recurrence is most often at parametria and at the root of the pelvic lymphatics. Following radium, operation gives another guarantee of cure. Out of 15 instances where radium was insufficient (persistence of the tumor foci in 6 cases) 8 were cured by surgery.

[We would suggest that operation be limited to those cases of cervix cancer where ulcer or nodule is wholly within the confines of the cervix with no infiltration of the ligaments. In all other cases irradiation gives better results.—Ed.]

End-Results in 117 Uterine Cancers are furnished by A. B. Spalding[1], treated from August, 1912, to April, 1924. With the patients treated before 1921, 71%

(1) California and West. Med., September, 1925.

either died or had recurrence. Fifteen % were without recurrence three to seven years, while 14% were without recurrence so long as traced, being lost track of, however, before the three-year period was reached. Fifty % were operated upon, of whom 31.2% were cured and 19% died as a result of operation. Since 1921, radium and deep *x*-ray has been used more extensively, and only 15% have been operated upon. The time is too short to judge fairly the comparative value of radiation *vs.* operation, and the problem is more complicated because since using radium and deep *x*-ray, although more patients are being received for treatment, a much larger percentage show advanced cancer growth. Of 25 patients dead after radiation, the life duration was less than with 20 dead after operation. However, of those dead after radiation, one died of an accident, one of a heart lesion, five had had incomplete operations by outside doctors before radiation treatment, and two died following hysterectomy by their family physicians after radium.

The prognosis for early cancer of uterus is so good and a fatal outcome for advanced carcinoma, regardless of treatment, so sure that the greatest hope for reducing the apparently increasing cancer death rate seems to lie in more frequent routine examinations by the family physician, prevention and eradication where possible of all local and general irritations, earliest possible pathologic diagnosis in suspicious cases and in proven cases, preoperative use of radium and deep *x*-ray followed in a few weeks by complete radical removal of uterus and parametrium.

Fibroid Complicated by Carcinoma. The operator, E. Straehley, Jr.[2], states the patient was an obese negress, of 39, admitted Sept. 11, 1924, complaining of aching pains and swelling in lower abdomen. She had been told 15 years previously by her physician that she had a fibroid, but, except for swelling, it had given her no trouble until six weeks before admission. It then

(2) Cincinnati Jour. Med., February, 1926.

began aching, this aching constantly increased. For past three years the tumor had been becoming smaller. Sept. 18, panhysterectomy was done. On account of cardiac condition thought it best to use spinal anesthesia. Perfect relaxation and complete anesthesia were obtained by using 1 decigram novocain. Histologic examination showed adenocarcinoma of fundus with fibroid.

Malignancy in a Cervical Polyp. This was found by E. Bishop[3] in a patient, of 68, with the classic complaints and signs of a complete prolapse. For a month she had had a little spotting; her general condition seemed as good as one would expect at her age. The uterus, a good deal of bladder, and some of rectum was out of vulva; the cervix showed a small erosion, due, presumably, to external contact and causing the slight spotting. A small polyp that seemed innocent also noted. Palliative treatment had been of slight help, and her social condition seemed to demand a return to increased efficiency; therefore she was subjected to an amputation of the cervix and an interposition of fundus. The pathologic report read "cervical polyp with basal cell carcinoma. Chronic endocervicitis." Microscopic section of polyp showed a malignant epithelial growth which took up practically the entire section. The epithelial cells were very irregular with numerous mitotic figures. No pearl formation was seen. Immediate consultation was held, and it was decided to apply radium in six weeks, which was done, in spite of the narrowed vagina, using 100 mg. in an inverted *T* in cervix.

[All cervical polyps should be sectioned and checked up for malignancy.—Ed.]

In the discussion, J. O. Polak called attention to two types of polypoid growth which might become malignant: *i.e.*, the fibroid polyp protruding from the body of uterus may show sarcomatous changes; and the mucous polyp an apparently-innocent affair, but by routine

(3) Amer. Jour. Obstet. and Gynecol., August, 1926.

examination we may find more than we would ordinarily expect. Polak has found four instances of malignancy in these simple mucous polypi by routine pathologic examination in the last five years.

Bilateral Primary Carcinoma of Tubes. A case is placed on record by Bower and Clark[4] from a patient, aged 25: History negative save for irregular menstruation for year prior. In June, 1922, onset of pain in lower abdomen, dysuria, constipation and fever. Examination showed abdomen moderately distended, tender in lower portion. Cervix edematous, uterus not increased in size; adnexa larger and tender. Diagnosis —acute salpingitis. Operation Aug. 24, slight amount of hemorrhagic fluid in abdomen, tubes about tripled in size, fimbriated end closed not adherent to neighboring organs. Removed together with appendix. Histologic examination showed bilateral malignant papilloma. Hysterectomy declined, radium accepted and begun. Seen again in December, complained of acute pain in right side, dysuria and leucorrhea. In Feb. 1923, supravaginal hysterectomy, ovaries small and apparently normal; histologic examination showed uterine cornu involved. Last report (July, 1924) in good condition.

Since primary cancer of tubes is rare, and the clinical picture that of salpingitis, and especially since diagnosis cannot be made even after opening abdomen, but only by histologic examination, make it advisable that all examples be published and to seek for means of microscopic diagnosis at operation. The latter may be facilitated by the presence of hemorrhagic fluid in abdomen, and by the aspect of tubal lumina, when opened at once many papillary vegetations are seen; again the os is patent. The importance of diagnosis at operation is considerable, calling as it does for complete ablation of uterus and adnexa. However, they deem supravaginal operation less dangerous, while it enables radiumtherapy later. The prognosis is very serious. Of a series of

(4) Archives of Surg., October, 1925.

144 collected by Lipschütz (22 doubtful) there were but four 5-year survivals. Even with operation the mortality is high, 48% in 133 examples; however, with complete ablation it is 35.8% against 56.2% for incomplete.

[The surgeon should be trained in gross pathology, or have a pathologist present at the operation. Secondary procedure on the usual malignant growth does little or no good in the final result. The time to be radical is in incipiency.—Ed.]

Lipoma of Broad Ligament. The patient operated on by R. M. Rawls[5] was a negress, aged 37, nullipara: For past 3 months had noted a gradual enlargement of abdomen associated with pain and swelling of left foot and leg. Otherwise history was negative except for frequent urination during day and three times during night at which time the amounts were markedly increased. Her maximum and present weight was 117 lbs. and she had suffered no loss of strength. Physical examination negative except for a tumor which extended from pelvic cavity to 4 finger breadths above umbilicus with lateral border slightly to the right of midline. The cervix was on a level with symphysis and fundus was enlarged, irregular, and pushed up and to right and there was a hard mass in right cornu. All laboratory tests were negative except a trace of albumin and pus cells in the urine. The patient was seen in consultation staff and the consensus of opinion was multiple fibromyoma and ovarian cyst. (During the first four days in hospital, there was an afternoon T., and occasional bloody expectoration and at times marked intestinal distention, hence thought it might be tuberculous peritonitis). At operation no free fluid and no adhesions in abdomen. The large tumor from left pelvis had carried round ligament and bladder reflection up into abdomen. Mass was anterior to omentum, and large bowel. Soon found to be intraligamentous instead of ovarian. As hyster-

(5) Amer. Jour. Obstet. and Gynecol., March, 1926.

ectomy was indicated easiest route was by freeing bladder reflection from lower third of mass and cutting round ligament at uterine end. Then the lipomatous tissue was exposed and tumor easily shelled out from the broad ligament except at lower pole, where it was intimately associated with the deep pelvic and femoral vessels from which the tumor received its blood supply. While the lipoma was in close contact with the femoral ring, no part of the tumor extended through to the thigh. The left ureter was dilated to twice normal size and was displaced by the tumor forward and to right of midline. (In a recent letter patient reports "feeling fine.") Frozen section showed lipoma, with large fat cells surrounded by thin connective tissue septa. This becomes a thick capsule in places. (Plate XXXI.)

[A rare location, though lipomata seem to have a tendency for sub- and retroperitoneal development.—Ed.]

Broad Ligament Extension in Cervical Cancer. Details of 5 cases are given by Martin and Rogers[6]: Much of the distressing pain with well-advanced carcinoma of the cervix arises from broad ligament extension with strictures in one or both ureters. The same type of extension usually brings about death through ureteral occlusion. Successful radiation therapy must prevent or retard this extension without damaging the bladder, rectum, small intestine or ureters. Experiments are described which show that well-filtered radiation up to 2.5 erythema doses produces no serious changes in the dog's ureter in six weeks. These findings suggest the ureter is more resistant than either the bladder or the rectum and will probably not be damaged when the broad ligaments are extensively treated with heavily-filtered radiation.

[This is the class of case, kidney function being favorable, in which intravenous lead helps.—Ed.]

(6) Amer. Jour. Roentgenol., April, 1926.

Fibroma of Ovary. H. M. N. Wynne[7] had occasion to operate on a nullipara, of 29. Aug. 25, 1925, soon after arising felt a sudden pain in the lower left side of the abdomen. This grew progressively worse during the day and she had some nausea but no vomiting. In 1917 the appendix and ⅔ of each ovary (said to be large cystic) had been removed and uterus suspended. He had examined patient very satisfactorily several times and never felt any enlargement of either ovary before the present illness. The last examination was 2 years ago.

Menstruation began at 11, occurred regularly every 28 days, lasted one to three days, and was unaccompanied by pain until after operation in 1917. Examination in August, 1925, revealed abdomen normal except for a little tenderness over the left lower quadrant. Immediately behind uterus there was a tender, rounded tumor about size of a tennis ball. The uterus was apparently normal, but posterior surface could not be felt. By careful manipulations tumor was lifted out of the cul-de-sac with immediate relief. While under observation the following two months the tumor apparently decreased somewhat, but was always felt behind uterus at each examination. She had no further pain. The *x*-ray did not show the tumor, but a pressure defect at the junction of rectum and sigmoid was seen. Oct. 29, a fibroid of right ovary (2 in. wide) and 7 small uterine myomata were removed. The pedicle not twisted, no free fluid in abdomen. Microscopic examination showed a pure fibroid of the ovary.

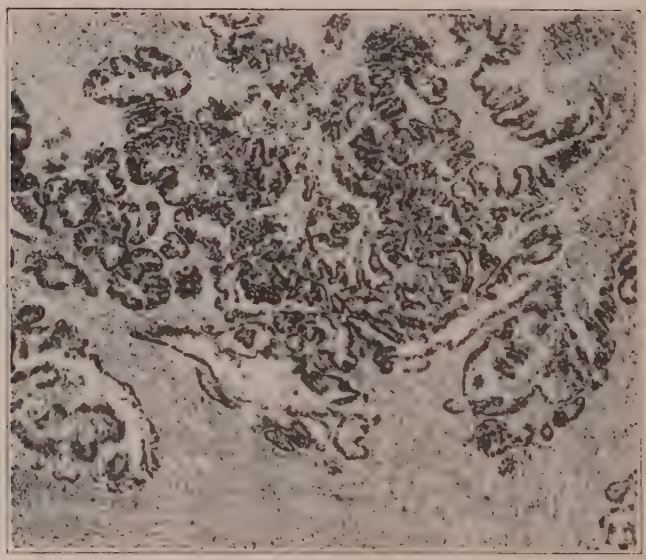
The growth of tumor to its present size was made in two years or less. It may have originated in the scar following resection of the cysts. The pain was in left pelvis while tumor was in right ovary. The pain was probably due to incarceration of the tumor in the cul-de-sac. There may have been some edema while it was

(7) Minnesota Med., May, 1926.

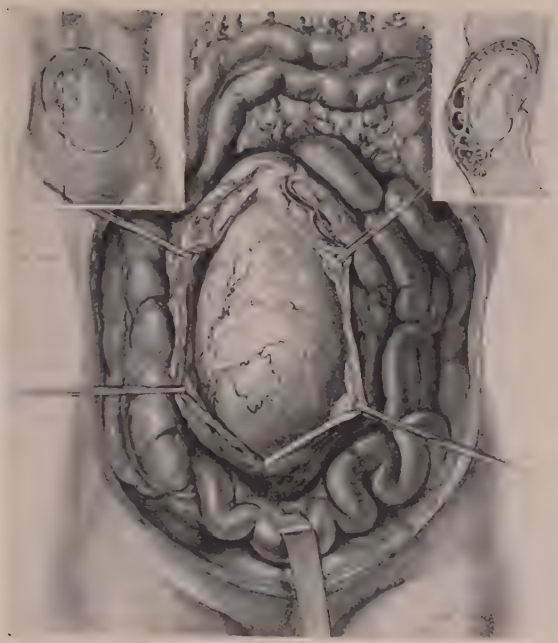
PLATE XXXI.

Lipoma of broad ligament. Posterior view of tumor *in situ* after partial enucleation.—Rawls, page 516.

PLATE XXXII.



Papillary adenocystoma of ovary; x 100.—Phaneuf, page 520.



Retroperitoneal teratoma *in situ*.

Same after removal, showing right kidney imbedded in its capsule. (Specimen measured 32x41 cm.)—Gordon, page 522.

Dermoids with early pregnancy, patient aged 31. Mathews, page 522.

Disappearing cyst of ovary (*x*-ray and pneumoperitoneum).—Stein, page 525.

incarcerated, which would account for the apparent decrease after it was lifted up in pelvis.

Two specimens of ovarian fibroma were shown by D. H. Douglas[8]. So far as she had been able to gather from the literature ovarian fibroids were infrequent. They were usually unilateral, pedunculated, and torsion of the pedicle was liable owing to their weight, with edema and necrosis, but this had not occurred in either of her cases. The etiology was uncertain. In 960 gynecologic structures removed by operation at the Coombe Hospital since January, 1923, there had been only two fibroids:

(I) A patient, aged 54, had been married 31 years, and had had ten children and one abortion. The last pregnancy was a full-term one 12 years previously. She had a normal menstrual history and menopause at 46. She was admitted complaining of a "swelling in the stomach." A hard tumor was removed from one ovary. The tumor, a solid fibroid, weighed 3 lb. No sign of any remaining normal ovarian tissue, and the tumor was attached by a broad untwisted pedicle. Microscopically it showed typical edematous fibroid structure, with myxomatous degeneration in places. (II) aged 63, married 38 years and had had one child 37 years previously; no abortions. Her menstrual history was normal and menopause at 43. She was admitted complaining of a "swelling in the stomach" which had lasted for four months; on vaginal examination the tumor could be felt as a hard mobile mass filling up the pelvis. Tumor removed with the ovary of opposite side, which was cystic. The tumor size of a large orange was attached by a very short pedicle; microscopically it showed typical fibroid structure, very edematous, and the cell nuclei had almost entirely disappeared. The opposite ovary was small and showed cystic degeneration with commencing papillomatous formation.

(8) British Med. Jour., April 17, 1926.

In the discussion, B. Solomons said "fibroid" was a bad term, and that evidently these were fibromas, which comprised 2% of all ovarian tumors. Bearing in mind the fact that there were three classes of this type described—where the ovary was wholly replaced by the growth, where the growth was confined to a part of the stroma, and where the fibroma was pedunculated—he inquired to which class the present specimens belonged, and if there was any hydroperitoneum or hydrothorax. Usually there were no symptoms, but the diagnosis was easy, except from a pedunculated uterine myoma in the neighborhood of ovary.

[It is unusual for fibroma of the ovary to attain a large size—there is always some torsion of the pedicle which may account for the edema and free fluid. Differential diagnosis from pedunculated uterine myomata is very difficult.—Ed.]

Massive Hemorrhage from Rupture of Ovarian Adenocystoma. After a review of the literature (1900-24) L. E. Phaneuf[9] could find no other case: His patient, aged 66, was admitted for pain, distention and constipation of 2 days' duration. These growths are usually multilocular, and commonly associated with free fluid in abdomen and with secondary peritoneal involvement, although ascites may be absent as long as the papillary masses remain within the cyst cavity. On perforation of the cyst, the papillary growths spread over the surface of neoplasm, invade the uterine and pelvic peritoneum, and finally the parietal peritoneum and that covering the abdominal organs. Extensive involvement of the peritoneal cavity is looked on as a malignant condition, although this is not always so, since the secondary masses have been known to disappear after removal of original cyst.

Operation same day (May 10). When abdomen was opened there was a gush of fresh blood. The abdomen contained about 2 liters of fluid and clotted blood. The

(9) Jour. Amer. Med. Ass'n., March 27, 1926.

pelvic peritoneum and small and large intestines were markedly distended, and were covered with numerous white tubercles suggesting malignant disease. On the right of pelvis, a large ovarian cyst covered with papillary projections was found; this had ruptured and clot filled the rent. The pedicle was clamped and tied, the cyst was removed, and blood evacuated. The uterus, left adnexa and right tube were also covered with papillary masses. The abdomen was quickly closed and patient left operating room in fairly good condition. When first seen, the clinical picture was that of an ovarian tumor, ascites, and intestinal obstruction. A severe hemorrhage was not suspected. The state of shock was ascribed to the obstruction, while the anemic condition was thought to be due to malignancy and cachexia. She made a surprisingly good recovery, and her constant improvement gives the hope she may be classed in the group in which the peritoneal involvement disappears after removal of primary tumor. (Plate XXXII.)

[The Editor has recently seen a similar case, rupture due to papillary invasion of the cyst wall with free hemorrhage and shock. Diagnosis of rupture was made and confirmed at operation.—Ed.]

Large Ovarian Cyst at 15 Years. The operator—in this instance—W. L. Secor[1] states puberty came on at 12½ years. At first regular, for nearly a year periods every 2 weeks. Had noted an enlargement for about one year. Eight months prior to admission abdomen became very large but suddenly subsided so she attended school, took part in basketball games, and complained of no symptoms aside from increasing abdominal fulness. At operation tumor seemed to fill the abdomen and pelvis. The intestines and liver were pressed so very tightly against the diaphragm that to the hand there appeared to be one solid smooth dome-shaped surface which felt very much like the under surface of the diaphragm. Individual loops of intes-

(1) Jour. Amer. Med. Ass'n. Sept. 18, 1926.

tine and separate organs were not manifest. The pressure on gallbladder and bile ducts was so great as to cause clay-colored stools. Adhesions marked the site of the leakage some months before. Gross examination showed a large, thick walled cyst composed of 31 distinct locules. The whole mass weighed 28 lbs. 6 oz. Smooth convalescence.

[Remarkable for the tumor to reach such a size in so young a patient.—Ed.]

Ovarian and Retroperitoneal Teratomas. The case-report by O. A. Gordon, Jr.[2], concerns a patient, of 50, who had had pressure in abdomen for previous 3 months, with increased size. Menopause at 45. A cystic mass apparently could be felt occupying most of abdomen. At operation for supposed large ovarian cyst, mass found retroperitoneal, and was enucleated; the origin seemed to be cellular tissue to right of spine, no pedicle. Kidney adherent and was removed with tumor. Recovery. Specimen was 16.5x13 in. and weighed 22 lbs. The wall was thick and surrounded by fat; interior trabeculated and made up of many small cysts full of brown gelatinous material. A few plates of bone in wall. (Plate XXXIII.)

The term "teratoid" applied to ovarian neoplasms is a misnomer, they are *cystic teratomas.* Such growths are among the most frequent of ovarian tumors (8 out of 125 at Bellevue Hospital). Polak states that prior to puberty, dermoids are the commonest ovarian tumors. Bilateral types are not infrequent (2 to 14%). Malignant change is rare—3 to 5%—and generally of pavement-type. Resection of ovary is justified only in bilateral tumors in young patients desiring children. Solid teratomas are very rare, as are the retroperitoneal ones.

Management of Bilateral Ovarian Dermoids. F. S. Mathews[3] relates experience with 6 cases, in patients of

(2) Surg., Gynecol. and Obstet., October, 1925.
(3) Annals of Surg., September, 1925.

24 (two), 29, 31 and 43 respectively (one not stated). In four associated with pregnancy.

The preservation of an ovary, the seat of a dermoid, has proved satisfactory. Menstruation has continued and in no case has any condition of the ovary arisen requiring a later operation. Enucleation of dermoids during pregnancy is not inconsistent with the continuance of gestation. On the basis largely of animal experiments, it has been believed that the early removal of a corpus luteum would interrupt a pregnancy. Pregnancy has continued in two of the above patients, whose corpora lutea were removed at second and fifth months of gestation. Pregnancy has not occurred after bilateral enucleation in any of the patients. (Plate XXXIV.)

[Enucleation of a dermoid leaving a functionating organ is not difficult, and should always be attempted in young patients with bilateral tumors. See also Koucky's analysis of 100 cases of ovarian dermoids, 1925 volume (p. 476).—Ed.]

Torsion of Pedicles in Ovarian Cysts. Three examples were operated on by M. J. McGrane[4]: (I) Age 17. The mass felt in left side was an ovarian cyst about as large as a medium-sized orange. It was very black and the pedicle twisted three or four times. The tube was also twisted in with the pedicle and had to be removed with the cyst. The right ovary was cystic and about ⅔ resected. An interesting result is this girl has menstruated regularly since. Before she was operated on, her periods were irregular and painful. (II) Age 56. Sudden onset of pain. Pelvic exploration revealed a prolapsed cyst of right ovary with a long, twisted pedicle. It was wedged down deep between uterus and rectum, but not adherent. (III) Age 39. On bimanual examination a mass about the size of a 3 months' pregnancy was found occupying the center of pelvis. He made a diagnosis of appendiceal colic. A very small inoffensive appendix was found. The mass thought to be a preg-

(4) Jour. Iowa State Med. Soc., May, 1926

nant uterus was a cyst of the right ovary with a twisted pedicle. Both appendix and cyst removed.

Torsion of Pedicle of Dermoid Cyst. This case narrated by M. S. Sichel[5]: occurred in an unmarried patient, of 30, who was admitted April 17, 1926, complaining of pain in the left lower quadrant and inability to void for 18 hours. Her past history was negative except for an appendectomy in 1921. She had never been pregnant, her menstrual periods being regular and the last being March 20th. She had missed no periods. The general physical examination was essentially negative except for the local findings. There was colostrum in both breasts but no pigmentation. A tumor was felt extending to two fingers above umbilicus. The patient was catheterized obtaining 1200 c.c. of urine which was normal on examination. The abdominal tumor dropped to two fingers below umbilicus. A pelvic examination was made and a diagnosis of 4½ months' pregnancy made. She was observed for one week during which time she passed urine spontaneously and normally. Toward the end of the week T. of 96.6° would develop daily and the patient constantly complained of pain in the left lower quadrant. At this time a mass distinct from the larger one was outlined in quadrant which was firm, tender and about size of an orange. A tentative diagnosis of torsion of the pedicle of an ovarian cyst complicating pregnancy was made. At operation two ovarian cysts were found, the one on right size of a baby's head and on left of an orange. The large cyst was a dermoid containing much sebaceous material and hair. The one on left was necrotic, firm and hemorrhagic and there were two complete twists of the pedicle. The pedicle was unwound and the cyst removed. This was also a dermoid containing three teeth, sebaceous material and hair. The uterus at operation showed no signs of being pregnant. A small portion of right ovary near the base of pedicle was left and both tubes

(5) Minnesota Med., August, 1926.

removed. The patient menstruated normally on the third day following operation.

[Torsion is often a slow and progressive process, not completely blocking the efferent circulation—hence the tumor may develop a parasitic blood supply and not produce acute symptoms.—Ed.]

Disappearing Ovarian Cyst. The patient seen by I. F. Stein[6] was 29, married 3 years, O-para. Smooth ovarian tumor about 2.5 in. wide and freely movable found in left adnexa. Because there was a history of sterility and negative smears were obtained from urethra, vagina, and cervix, a patency test was made on July 27, a few days after first visit. Her last menstrual period was July 3. The gas passed through the tubes very readily under low pressure. A roentgenogram was taken in the partial knee-chest position which verified the diagnosis of ovarian cyst. On the film the cyst appeared to be about the size of a tennis ball. (Plate XXXIV.)

About 18 days after first examination and without reexamination the abdomen was opened, and much to his chagrin there was no cyst. The ovary on the left presented a slightly uneven appearance; and three very small cysts, not over ½ cm. in size, could be seen on the surface. To determine the nature of the small cystic areas a resection of ovary was made and a plastic operation done. There was also a small myoma about 1 cm. wide in the posterior wall of uterus which was enucleated. The pathologic report was:

"A section of ovary contains three cysts. The larger, about 0.5 cm. in diameter, is lined by a row of cells the most superficial of which is flattened into a syncytium-like border. This lining contains numerous thin walled blood vessels, and at one point it forms in the lumen a papilliform projection composed of cells having the appearance of lutein cells. The cyst contains hemorrhagic material and there is considerable evidence of hemorrhage throughout."

[Thin-walled cysts of this description disappear suddenly.—Ed.]

(6) Surg., Gynecol. and Obstet., July, 1926.

Malignant Tumors of Ovary. Norris and Vogt[7] give the end-results in a series of 56 instances: Ovarian tumors account for 7.7% of all gynecologic lesions, and 14% of all gynecologic tumors. In 1028 ovarian neoplasms they found 11% of malignant growths.

The symptomatology is often slight, even where mass is quite large and already disseminated. Histologic examination is of great help for fixing the prognosis, and may afford important information as to postoperative treatment by *x*-rays and radium. The 2 most common types are glandular- and papillary adenocarcinoma. There is survival of 3 years or more after operation in 23% of glandular- and 70% of papillary adenocarcinoma. Nearly 60% of cases which seem operable survive 3 years.

Malignant ovarian tumors start in 5 ways: (1) They are malignant from beginning; (2) result from degeneration of a benign growth—common; (3) are of metastatic origin; (4) arise by implantation of primary lesion at more or less distance, often *via* the tubes: (5) arise from a contiguous or adherent tumor. Ovarian carcinoma may proceed from Sampson's "perforating cyst." Tubal dissemination from fundus to ovary is not uncommon. While propagation of an ovarian tumor to fundus is possible. In associated cancers, the ovarian lesions are generally most extensive, no matter what the origin. In such cases the prognosis is not favorable—7 out of 8 cases did not survive 3 years. Prognosis is less favorable also in primary malignant tumors than in malignant degeneration of benign cysts.

Even in apparently desperate cases, malignant ovarian cysts should be subjected to laparotomy. During ablation of such cysts, incisions into growth to facilitate extraction expose to dissemination. Primary malignant tumors are usually bilateral, and benign cysts which become malignant tend to involve both sides. Secondary malignant growths of ovary are, as a rule,

(7) Surg., Gynecol. and Obstet., November, 1925.

larger than the primary ones elsewhere. Malignant neoplasms of ovary may occur at any age. About 7% of the mucoid cysts and smaller proportion of the dermoids showed cancerous degeneration. Differentiation between simple papilloma, semimalignant papilloma, and carcinoma is often impossible before operation, and in a few cases can be made only by microscopic examination. Recurrence takes place in 1st year generally, less often in 2d and rarely after 3d year. Bilateral growths offer a less favorable prognosis than unilateral ones. Given a malignant ovarian tumor on one side with opposite healthy, the surest plan is to perform hysterectomy and bilateral salpingo-oöphorectomy. The value of postoperative radiation is still uncertain, the authors found no success with it.

[Hysterectomy and bilateral salpingo-oöphorectomy should be done more often for suspicious ovarian tumors at or after the menopause—for complete removal is more difficult in recurrence.—Ed.]

Krukenberg Tumors of Ovary. Ovarian malignancy in general is discussed by R. F. Matters, [8] with special reference to the Krukenberg. Latter type has been shown by Erdheim and Schiller to be a pure carcinoma and always secondary to carcinoma of the gastrointestinal tract or of the gallbladder. The cancer cells from these parts are said to fall on to the ovary and to become implanted there, but, being secreting cells, these cells continue to produce the secretion and to become distended, as there is no gland lumen into which to pour the secretion. These cells are not closely packed together, but invade either in small groups or in a diffuse form and they are surrounded by the ovarian connective tissue. The distention of the cell by its own secretion produces a globular shape and the nucleus is pushed to one side and flattened against the cell membrane, so in a well stained slide the appearance is typical and the cells resemble signet rings and Krukenberg once called

(8) Med. Jour. Australia, Feb. 13, 1926.

it the "signet ring tumor." The distention of these cells has a pronounced irritative effect upon the connective tissue and so stimulates it that it has the appearance of a fibrosarcoma, whence the old name was derived. Macroscopically these Krukenberg tumors are smooth, the surface is bossed and the whole ovary appears to have undergone enlargement. The tumors feel rather sponge-like and not so much of a cystic sensation exists, although elasticity is present.

The origin of the primary tumor varies, but in 5 cases the primary condition was found twice in the gall bladder and three times in the pylorus and pyloric antrum.

In view of these findings it seems necessary to regard the ovary as a possible site for metastases in many cases of abdominal malignant disease and this organ should always be suspected in these cases. Bonney states the ovaries in many of his Wertheim operations appeared microscopically unaffected by the cancer cells, but on microscope investigation cancer cells have been found in a very large number of cases. Bonney also points out that this occurs "where there is no reason for suspicion from the lymphatic channels if regarded anatomically." Possibly the ovarian vessels in these cases may cause the metastasis or possibly the distribution occurs by "permeation." The conclusion is that cancer cells find in the ovary a suitable medium for multiplication so it is essential before considering an ovarian carcinoma as primary to eliminate the possibility of the tumor being secondary to any uterine, abdominal or breast carcinoma.

[An excellent conclusion.—Ed.]

Sarcoma of Ovary. In addition, the patient, whose case-history is given by G. W. Fitzgerald[9], had adenomyoma of rectovaginal septum: She was a IV-para, aged 33, and complained of dysmenorrhea of 4 months' duration, a tender lump in right side, frequency for

(9) Lancet, Jan. 23, 1926.

micturition, and some pain on defecation. No loss of weight. The left ovary was represented by the wall of an ordinary cyst, and the tube was dilated at its ostium. The right ovary was partly solid and partly cystic, and distention of the ostium of tube was seen. From the cystic portion of this ovary tarry fluid exuded when opened. There was close adhesion between the posterior vaginal wall and the anterior rectal wall, with a cluster of minute peritoneal cysts around this. The area on the vaginal side was removed, together with adjacent posterior vaginal wall. Examination of sigmoid showed one portion with the same induration as in the rectal wall, and a crop of tiny peritoneal cysts which were easily wiped away. A section from the growth removed with the vaginal wall showed adenomyoma, while another section of the solid portion of right ovary (in which there was the tarry cyst) showed sarcoma.

Rupture of Ovarian Sarcoma. Scheffey's essay on sarcoma of ovary in young patients was quoted in the 1925 volume (p. 484), but none of the 118 instances mentioned in it had spontaneous rupture as in the case seen by H. Koster[1] in a patient, aged 14: Admitted (April 16), complaining of pain and vomiting, of 14 hours' duration. Four months previous she noticed a swelling on neck which gradually increased in size, was not painful but mechanically interfered with head movements. At one of the local hospitals she was told that this was a tuberculous node and received treatment for it on the basis of this diagnosis. Menstruation began nine months ago, regular, every 30 days, four-day habit, profuse flow, no dysmenorrhea, last regular period, April 3. Three weeks before admission began to have pain in the lower abdomen which lasted for a few hours and were accompanied by vomiting spells and would then disappear for few days. Fourteen hours before admission had a sharp pain in lower abdomen which recurred at inter-

(1) Amer. Jour. Obstet. and Gynecol., November, 1925.

vals of a few minutes. This was quickly followed by vomiting which did not bring any relief. The pain became more severe and the diagnosis of appendicitis made by her family physician, caused the patient to be brought to the hospital.

A large swelling on neck, hard, not tender, showing no signs of inflammation, not movable on underlying tissues, but not adherent to skin. It was about 2 in. wide and regular. The abdomen very rigid and tender throughout, particularly over both lower quadrants. Pressure-release tenderness was obtained all over the abdomen as was also a tympanitic note. Rectal examination revealed a small uterus, in anteversion and anteflexion with tenderness in the posterior culdesac and no palpable adnexa, although there was definite tenderness in fornices. The blood showed a moderate secondary anemia and a leucocytosis of 12,000. With a provisional diagnosis of acute appendicitis, operation was decided upon. Abdomen was found to contain considerable free blood. Both ovaries were fragmented and blood was oozing from the torn surfaces. Pieces of ovarian tissue were found lying free, of mushy consistency and very readily disintegrated under the slightest pressure of fingers. It was estimated from a reconstruction that ovaries originally had a diameter of approximately 2 in. There was no evidence of abdominal metastases or of retroperitoneal space involvment. A bilateral oöphorectomy and an appendectomy were performed and the abdomen closed without drainage. Microscopically, the ovarian tissue removed showed small round-cell sarcoma. She received radiation for the sarcomatous metastatic focus in the neck, but rapidly becoming progressively emaciated, died 2 months after leaving.

Inguinal Endometriosis. J. A. Sampson[2] reports 8 examples of endometriosis of the intraperitoneal portion of the round ligament (so-called "adenomyoma"

(2) Amer. Jour. Obstet. and Gynecol., October, 1925.

of that structure) a similar invasion of other pelvic structures was also present. The distribution of these lesions was similar to that found in the implantation of cancer in peritoneal carcinosis secondary to carcinoma of the pelvic organs. In 4 of these an endometrial he-

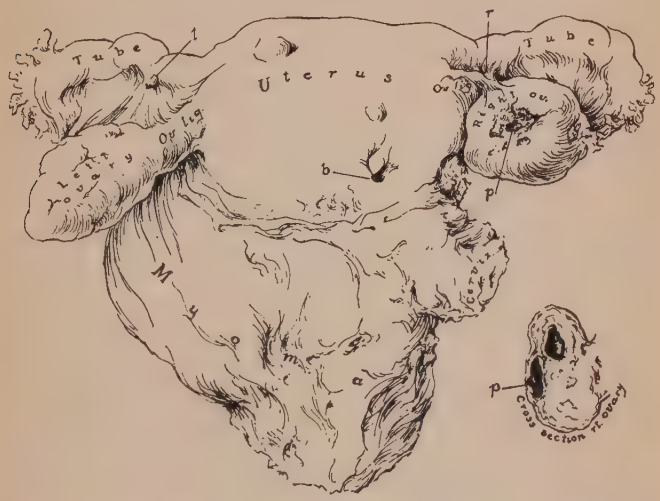


Fig. 43. Peritoneal endometriosis with implants on posterior surface of uterus (*b*), left broad ligament (*l*), about right ovarian ligament (*r*), left round ligament and in culdesac; small endometrial hematoma of right ovary. Posterior view of uterus, tubes and ovaries removed at operation, with insert of a cross section of the right ovary (X⅝). The scars and adhesions from the peritoneal endometriosis are indicated and also the characteristic appearance of the right ovary the seat of a small endometrial hematoma. The latter had either perforated (*p*) causing the ovary to become adherent by its under surface to the posterior surface of uterus, or else endometrial tissue had simultaneously invaded these structures. The endometriosis of left round ligament is but one of similar lesions of implantation origin involving several pelvic structures, as in peritoneal carcinosis. The endometrial tissue was probably primarily derived from menstrual blood escaping through the tubes into peritoneal cavity. No evidence found of an invasion of uterine wall by its mucosa (Sampson).

matoma of one of the ovaries was also present (both in one patient). In 3 others a small amount of endometrial tissue was present in one or both ovaries, without the development of an endometrial cyst or hematoma. In the remaining one, endometrial tissue was not found

in either ovary. He believes that in all 8 cases the peritoneal endometriosis was mainly of implantation origin, primarily from epithelium carried through the tubes during menstruation, and secondarily from the menstrual reaction of endometrial foci on the surface of the peritoneum or the perforation of an ovarian hematoma. In Case 3, venous or lymphatic metastases from a possible primary uterine endometriosis may have given rise to some of the superficial endometrial lesions of the uterine wall. Sampson is of opinion also that we are warranted in stating that possibly inguinal endometriosis may be secondary to that in the pelvis and, if so, that it may arise from: 1. Metastasis through lymph vessels invaded by endometrial tissue implanted about the uterine end of round- and the broad ligament. 2. A direct extension or metastasis along the round ligament from a peritoneal endometriosis about the abdominal inguinal ring. 3. Metastasis from the direct invasion of the uterus or tube by their mucosa with extension to the superficial lympthatics and veins and also from endometrial tissue escaping into uterine vessels during menstruation. 4. Implantations in a hernial sac.

Endometriosis in Cesarean Scars. In the 2 patients referred to by N. S. Heaney,[3] it would seem clear that while the uterus was open, pieces of the endometrium were carried to abdominal incision and there became engrafted and produced these adenomas. Jacobson experimentally produced endometrial adenomas in rabbits by engrafting bits of uterine mucosa. It seems strange, however, that so few adenomas have been reported after cesarean section, as this operation is so frequently performed and the chance of endometrial débris being sewed up is so great. On the other hand, a relatively large number of adenomas have been observed after ventrofixation, an operation much less frequently performed than cesarean section, and in

(3) Amer. Jour. Obstet. and Gynecol., November, 1925.

which the opportunity for the introduction of grafts would seem to be much less ideal. During a cesarean section it would seem impossible to avoid contaminating the wound with endometrial tissue, while in ventrofixation the grafts would have to be carried by the needle and thread at the time of the operation or grow along the suture tract during healing.

The adenomas appear usually a few weeks or months after operation, but may be latent and not manifest for several years. In some are entirely without symptoms. Usually, however, the nodules swell and are painful during menstrual period and for several days afterward and tender at all times. When first noticed may have the feel of a small omental hernia and be slightly movable; as they grow older, become larger, more fixed and raised above the surrounding skin, being puckered and bluish, with the appearance of an inflammatory swelling. If a patient after cesarean section discovers a nodule along the scar which feels like a small omental hernia and which is tender, this may be an adenoma of endometrial type. If the nodule swells and becomes painful during menstruation, this syndrome should make diagnosis certain.

Another case was seen by W. C. Danforth[4]. The patient was a primipara, of 20, at time of section. Returned 2 years later with hard, round mass in lower third of scar. Excision of supposed desmoid, but examination showed typical areas of endometrium.

[We have recently seen another case of endometriosis of the abdominal scar, the uterine wound was densely adherent to the abdominal wall, extension could have been through stitch hole leakage.—Ed.]

Endometrial Invasion of Bladder. In the 2 patients seen by F. E. Keene[5], aged 40 and 48 respectively, intense bladder symptoms were produced by endometrial invasion of the bladder wall, secondary to cysts of the

(4) Amer. Jour. Obstet. and Gynecol., November, 1925.
(5) Ibid.

ovary. Prior to operation the exact nature of the lesion was determined by exclusion of inflammatory neoplastic lesions of kidney and bladder and by the more or less typical cystoscopic picture in each case. Unless the possibility of such a lesion is borne in mind, it might readily be mistaken for a malignant tumor. Relief of the symptoms and restoration of the bladder to normal followed upon removal of both ovaries, showing that excision of the affected area in bladder is unnecessary. (Plate XXXV.)

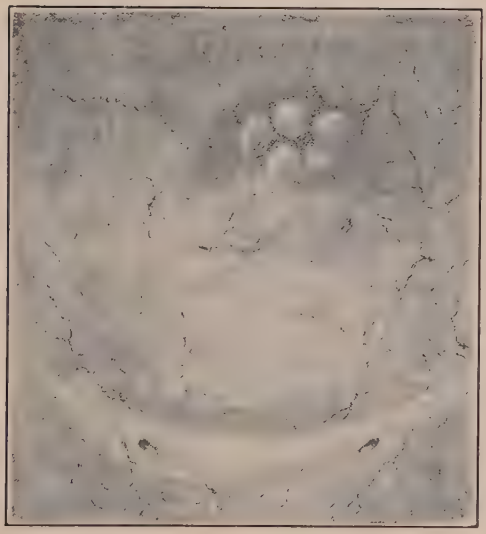
[From this one could make the deduction that endometrial tumors will atrophy when ovarian stimulus ceases.—Ed.]

Heterotopic Endometrial Implants. Attention is called by C. Semb[6] to the great variety of organs in which this endometriosis develops. The adenomyomas containing tissue resembling uterine mucosa represent actual endometrium outside of the uterus, and behave as such. He found them in 5.5% of 126 ovarian tumors, corresponding to 10% of the benign cystic tumors of ovary examined. In 6 others, they were found on the intestine, exterior of uterus, ligaments or tubes. He tabulates the findings in the 7 ovarian cases. Extensive formation of bands and adhesion to the peritoneum was constant, evidently secondary, testifying with other findings to an exceptionally irritating action from the contents of these cysts, all of the tar-cyst type. No other cause for the adhesions could be detected. In one virgin, they filled the entire small pelvis. The clinical picture in all was that of chronic pelvic peritonitis. Only 2 patients were married. Nothing indicated malignancy in these cases.

Malignant Change in a Tumor of Recto-Genital Pouch. The case is believed by Barnes, Thomson and Lamb[7] to be very rare: In addition there was diffuse

(6) Norsk Mag. f. Lægevidensk. (quoted in Jour. Amer. Med. Ass'n., June 12, 1926).
(7) Quarterly Jour. Med., January, 1926.

PLATE XXXV.



Cystoscopic picture of Case I.—Keene, page 533.

infiltration of lungs and intense erythremia: Erythremia of intense degree without splenic enlargement is rare, but that it should prove case to be due to a diffuse growth scattered throughout the lung alveoli, and containing unstriped muscle-tissue, and that the primary growth should be a tumor of the recto-genital pouch which had been sarcomatous, is a combination so rare one cannot expect to see its parallel. Onset of dyspnea at age of 27 (1923). Death, April 4, 1925. From the pathologic findings it is clear the cyanosis was due to obstruction to the oxidation of blood in the lungs by the interposition of a layer of sarcomatous cells between the alveolar epithelium and the pulmonary capillaries. Pressure on the thoracic duct by metastatic deposits in glands accounts for the chylous effusions in abdomen and in left pleural cavity. The most important practical conclusion seems to be this case shows definitely that tumors of the recto-genital pouch may become malignant, and when they are discovered should be removed completely wherever possible: they stress this point, for partial removal of these tumors where they have infiltrated widely is largely practised. Certain points of pathologic interest merit attention: (1) The sarcomatous character of the malignant change. (2) The extension by permeation of the retroperitoneal lymphatics, leading eventually to chylous ascites and pleurisy. (3) The curious diffuse invasion of lungs.

HEAT, ELECTRICITY, RADIUM AND ALLIED METHODS OF TREATMENT

W. P. Healy[8] remarks that enough reliable statistics on end-results of *treatment of carcinoma of the cervix* by irradiation are now available from clinics throughout the world, to indicate that hysterectomy is no longer

(8) Amer. Jour. Obstet. and Gynecol., December, 1925.

necessary. Evidence is accumulating to indicate that hysterectomy for carcinoma of the cervix even when combined with pre- or postoperative irradiation, or both together, may be a serious handicap to obtaining the full benefit of ray therapy. There is at present not sufficient evidence to justify the treatment of adenocarcinoma of the corpus by irradiation alone in cases favorable for hysterectomy. Evidence would seem to justify the care ful, continuous, intensive treatment of all cases of carci noma of cervix with combined radium and *x*-ray therapy. Prevention is better than cure; much more attention should be paid to the cure of cervical lacerations and inflammations. Subtotal hysterectomy should not be done in the presence of a diseased cervix. In subtotal hysterectomy for fibromyoma the specimen should be opened and the endometrium carefully inspected before the final decision to leave the cervix is made. Surgery has definitely failed in carcinoma of the cervix. Irradiation is not ideal but represents a real epoch in the treatment of the disease.

[Statements confirm our personal experiences.—Ed.]

CASES TREATED BY RADIUM, 1918-21 (Bailey)

Cervix	Total	Alive Jan. 1, 1925	Per Cent Alive
Early	35	14	40
Borderline	52	14	27
Advanced	288	25	8.6
Total Cervix	375	53	14
Recurrent Cervix	139	28	20
Postoperative Irradiation	25	16	64
Corpus	27	12	44

CASES TREATED BY COMBINED RADIUM AND X-RAY, 1922-24 (Healy)

Cervix	Total	Alive Jan. 1, 1925	Per Cent Alive
Early	44	41	93
Borderline	57	42	73.6
Advanced	252	113	44.8
Total Cervix	353	196	61
Recurrent Cervix	71	41	57.7
Postoperative Irradiation	5	5	100
Corpus	40	28	70

At the Mayo Clinic, according to H. H. Bowing[9], they find a *combination of surgery, radium, and x-rays* efficient in combating carcinoma of cervix. It is to be regretted that so few patients are seen in the early stages when the maximal response can be expected. Much depends on the first examining physician and he must realize his responsibility. All irregular menstrual phenomena and vaginal discharge, regardless of its character and the age of patient demand a most careful examination to determine the cause. Treatment should be decidedly individual as the response of tissue is different in each case. The broken dose permits a very flexible procedure capable of meeting the needs of the patient during the treatment. Close coöperation of all concerned, including the first examining physician, surgeon, pathologist, and radiotherapist, is essential, and it is only through such management that we can hope for good and lasting results.

[Early diagnosis and massive irradiation give results superior to surgery.—Ed.]

Surgery vs. Radiation for Fibromyomata. Experience at the Mayo Clinic is set forth by F. A. Ford[1]: The 250 patients operated on represent those registering consecutively during 1918, for whom a diagnosis of fibromyomata was made and who were referred for surgical treatment, while the 344 treated by radiation include a group from each year (1918 to July, 1924), because of the gradually-changing dosage and technic of radiotherapy during that time.

The average age of the 250 patients at the time they presented themselves was 42.0. The average age of the 245 patients treated by radium was 44.4 years; of the 65 treated by radium and roentgen rays, 46.3, and of those treated by *x*-rays alone, 47.1 years. While the

(9) Am. Jour. Obstet. and Gynecol., March, 1926.
(1) Surg., Gynecol. and Obstet., February, 1926.

presence of tumors had often been detected many years before the menopause the symptoms apparently had not been troublesome until patient approached that period.

TABLE I.—CHIEF COMPLAINTS AND OBVIOUS SIGNS AT THE TIME OF ADMISSION

Symptoms and Signs	Treated by Radiation	Treated by Operation
	Cases	Cases
Profuse menstruation	95	63
Irregular bleeding	63	22
Pelvic pain on pressure	11	13
Lower abdominal pain	36	38
Cystitis or urinary symptoms	8	3
Dysmenorrhea	8	16
Prolapsed uterus	2	..
Backache	5	..
Vaginal discharge	7	..
Frequent miscarriages	1	..
Pseudocyesis	1	..
Weakness and fatigue	12	12
Presence of tumor noted	20	57
Symptoms unrelated	97	59
Tumor found in routine examination without symptoms	5	3

TABLE II.—TYPE OF MENSTRUATION

Symptoms and Signs	Treated by Radiation	Treated by Operation
	Cases	Cases
Profuse and prolonged	183	95
Irregular	123	42
Scanty	13	11
Regular, moderate	51	82
Continuous	11	..
Painful	82	82
Past menopause with return of bleeding	11	14
Pelvic pain	67	73
Total	344	250

TABLE III.—THE FREQUENCY AND TYPE OF PREVIOUS TREATMENT FOR OPERATIVE CASES

Treatment Elsewhere	Cases	Treatment at Mayo Clinic	
		By Radiation	By Operation
Myomectomy	25	15	10
Unilateral oophorectomy	27	14	13
Partial bilateral oophorectomy	1	..	1
Cysts of ovary	10	4	6
Drainage of pelvic abscess	5	1	4
Dilatation and curettage	54	42	12
Polyps from cervix	5	4	1
Tumors from cervix	9	2	7
Trachelorrhaphy	5	3	2
Internal suspension of uterus	19	17	2
Cauterization of cervix	1	1	..
Hysterotomy	1	1	..
Radium (2 had 2 applications)	3	3	..
X-ray	1	1	..

The conclusions from this large experience are: In these unselected examples of fibromyomata treated by operation and by radiotherapy, a relatively high percentage of the latter has required further treatment, either repeated radiation (18%) or operation (13.7%) as compared with 4% of the surgical group who received further treatment. However, more recent cases, particularly after *x*-rays are showing definitely better results through greater experience in the dosage required. A study of individual cases shows so many thoroughly satisfactory results with radiotherapy that the discrepancy in the total results must apparently be attributed to injudicious selection of cases, or to inadequate dosage. Great care must be exercised to rule out malignant disease at the time of radiation. Curettage should precede treatment in any with suspicious symptoms. Inflammation, while apparently uninfluenced by radiation *per se*, as is shown by the lack of reaction to *x*-rays, is undoubtedly occasionally aggravated by the manipulation inci-

dent to the application of radium. Unusually hard fibromyomata containing extensive calcium deposits cannot be reduced satisfactorily by radiation; an incarcerated pelvic tumor is undoubtedly best removed surgically because of the inability to exclude adnexal disease. A roentgenogram may occasionally aid in detecting calcium deposits within a tumor.

The need of extreme care in excluding malignant disease is indicated by the fact that in 6 treated by radiotherapy a well-established malignant process appeared within a year of treatment. One other patient has probably malignant disease of the ovary, but refuses operation. Two others developed malignant disease within the 2 years after treatment, although in one this may be considered a recurrence of the epithelioma in the abdominal wall at the time of radiation. In 4 patients, who remained free from symptoms for 3 years following treatment, malignant disease appeared. This may not be a higher percentage than that of pelvic malignant disease for all women at their age (1.1%). However, it raises the question whether a focus of relatively devitalized tissue with altered blood supply may favor malignant change. Ford believes that complete subsequent histories should be kept for all patients treated with radium or *x*-rays so we may have more data. One death followed application of a small amount of radium, and 2 surgical deaths, one of which must be attributed rather to the primary appendectomy.

[We feel that in the treatment of fibromyomata, radium and operation have definite fields of usefulness, and each give satisfactory results if the selection of cases is made with care.—Ed.]

The paper by Clark and Block[2] on *treatment of fibromyomata,* records the present opinions of the staff at University of Pennsylvania (Gynecological Department):

(2) Amer. Jour. Obstet. and Gynecol., October, 1925.

COMPARATIVE ANALYSIS OF OPERATION AND IRRADIATION

	Operation	Irradiation
Total number	267	153
Number traced	150	92
Percentage traced	56.1	60.1
Number cured	142	82
Percentage cured	94.7	89.1
Mortality percentage	1.1	none

They conclude treatment of fibromyomata should be undertaken only by those thoroughly familiar with the operative as well as the irradiation method. The mortality of radium irradiation in properly-selected cases has been *nil* and satisfactory results will be obtained in about 90% after one treatment. The mortality of uncomplicated fibroids subjected to operation is rapidly approaching the vanishing point, and is *nil* in this series. That in complicated cases subjected to operation is 3%, but the mortality of their entire operative series varies from 0.7 to 1.4%, depending on cases included. The mortality of the entire series of 422 cases, irradiated or operated upon, varies from 0.47 to 0.7% according to the method of calculation. The end-results of operation are satisfactory in about 95%. The mortality and morbidity of fibroid tumors are usually due to complicating lesions.

[By proper selection mortality may be reduced below that possible to any surgeon who relies entirely on operation.—Ed.]

X-Ray

Corpus Luteum for Prevention of Nausea in Radiotherapy. In their preliminary report, Lafferty and Phillips[3] state radiation sickness occurs more often and severely in women. They have seen some benefit

(3) Amer. Jour. Roentgenol., November, 1925.

derived from alkalinization and from the proper direction of diet, but in uterine conditions neither of these measures has been a decided success. The nonmalignant cases seem to suffer more from this condition than the malignant ones. This is probably due to the fact that many of these patients are younger and the ovaries more active in their internal secretory function, although the age does not seen to play any part in the readiness with which they respond to corpus luteum. After having observed the benefit from corpus luteum intravenously in those suffering from nervous and emotional symptoms following artificial menopause by irradiation and also in some cases of vomiting of pregnancy, they determined to use it in patients while under treatment, thinking that the action of the rays on the internal secretion of the ovaries might be partially responsible for the condition.

They have treated 16 cases, ranging from 25 to 45 years. Ten were entirely relieved, 4 were improved and 2 were unimproved. One of latter was 25 years of age, the other 45. All of these 16 patients were known to become very much nauseated following small doses of rays, when corpus luteum was not used. Some of those listed as completely relieved were given the extract on alternate treatments and each time it was not given they were very much nauseated. They administer usually only 1 c.c. intravenously immediately after treatment, but in some 2 c.c. are required. After observing the benefits they thought it possible that extracts of some of the other ductless glands might prevent this very annoying condition. But have not as yet had the opportunity of investigating this.

[A clever suggestion worthy of further trial.—Ed.]

Control of Uterine Hemorrhage by *X*-Ray. A series of 60 patients were treated by W. S. Newcomet[4]:

(4) Jour. Amer. Med. Ass'n., Nov. 7, 1925.

Metritis local pelvic inflammation	40
Fibroid tumors	10
Fibroid tumors, complicated with cardiac conditions	3
Fibroid tumors, complicated with renal disease	2
Fibroid tumors, complicated with anemia	2
Pulmonary tuberculosis, pelvis normal	1
Pulmonary tuberculosis, endometritis	1
Renal disease, pelvis normal	1

NUMBER OF TREATMENTS REQUIRED TO CONTROL HEMORRHAGE

Treatments	1	2	3	4	5 or over
Cases	7	25	10	8	6
Not controlled cases	..	..	1	..	3

Ages of patients	30	40	45	50	55	60	Not given
	4	10	10	14	3	1	18

Hemorrhage controlled, but continued to menstruate	6
Hemorrhage controlled, subsequent roentgen ray	4

He wishes to emphasize that uterine hemorrhage from general systemic or local benign origin, of many different forms, can be controlled by a rather mild roentgen irradiation of such dosage as to leave no perceptible change of the skin over pelvis, which is used as the port of entrance. Where a larger amount of irradiation is desired, a larger number of ports of entrance should be used. If this mild irradiation fails, he feels that heavy irradiation will also fail. In some instances, it is possible to control the bleeding without causing a cessation of menstruation. This result, however, is not always obtainable, and in those nearing the menopause, the control of bleeding is likely to lead to a permanent cessation of menstruation.

[Mild and repeated irradiation is relatively safe, and in the absence of local pelvic inflammation gives very satisfactory results.—Ed.]

X-Ray in Ovarian Hypofunction. In his essay on this topic, I. S. Hirsch[5] refers especially *to regulation of menstrual function*: The menstrual deficiencies may be classified as—

As to cause:

1. Essential, due to changes in the generative organs.
2. Symptomatic, associated with such systemic diseases as chlorosis, tuberculosis, etc.

(5) Radiology, August, 1926.

As to type:

1. Complete cessation—amenorrhea (for months or years).
2. Scanty amount / Normal amount } Oligomenorrhea
3. Normal amount / Prolonged interval } Opsomenorrhea
4. Scanty amount / Prolonged interval } Oligo-opsomenorrhea

As to the time of its inception:

(a) At puberty.

(b) After a period of more or less normal menstruation.

The treatment consists in the administration of a small dose of radiation to each ovary. The dose necessary to produce the desired effect is 15% of the castration dose delivered to each ovary through 2 portals. (It is necessary to treat both sides because of the alternate ovulation). The 4 portals which take in all the pelvic structure may be irradiated at one sitting, or a portal at a time with intervals of a day or two. The series should not be repeated until after a lapse of several months, but meanwhile a small dose of radiation may be applied to the thyroid or the hypophyses if the status of the individual demands it. A slight variation from the 15% may be necessary, depending (1) on the age, (2) thickness of abdominal wall; (3) duration of ovarian hypofunction. There should be no irradiation sickness, and no change in the skin of the portals treated. It is to be pointed out that *x*-ray treatment showing no results must not be continued. The possibility exists that even the relatively small dose, unless carefully administered, may produce permanent amenorrhea in patients in the menopause age. This treatment is, of course, contra-indicated in symptomatic amenorrhea, associated with such general systemic diseases as lues, tuberculosis, nephritis, pernicious anemia, also when secondary to adnexal disease, tumors, or cystic disease of ovary. Amenorrhea in advanced age or of very long duration, or that resulting

from curettages after numerous abortions, does not respond to this treatment. In dystrophy-adiposo-genitalis, the involvement of other endoctrines may necessitate other treatment.

Of the 36 cases studied, in 22 menstruation appeared after the treatment and in the majority followed during the entire period of observation, and the somatic and psychic symptoms of the ovarian hypofunction disappeared rapidly after menstruation set in. The longest period of amenorrhea to be followed by a menstruation after the irradiation was six years. Successful results were obtained in a patient of 30 years (Case XXI), who had not menstruated for 3 years, in one, of 28, for 2 years, and still another aged 34, for 17 months. In most instances the interval between 1st radiation and menstruation was 28 days. In two, was 2 and 3 weeks, respectively. (Never less than 2 weeks). In four came on 7 weeks after treatment. In Case II appeared in 10 weeks, and pregnancy ensued after 8 regular periods. In Case XVI, a sterile patient, of 35 it appeared 16 weeks after a 2d partial dose had been given, the 1st—3 months' period—having failed.

In some, simultaneously with the regulation of menstruation, dysmenorrheal symptoms were favorably influenced. In others latter did not improve, in spite of improved function. Occasionally the pain with first menstruation was very severe, in others with oligomenorrhea the increased function was abnormal. Certain cases of hypomenorrhea had marked adiposity, this was reduced after onset of menstruation without other measures, *e.g.*, loss of 13, 47 and 60 lbs., respectively.

The treatment failed in 14 cases. Analysis of these cases aids in defining the limitation of this treatment. This shows two patients to be 36 years old. One of these, Case III, had menstruated 3 times in five years and the other, Case X, had menstruated 12 times in the last eighteen years, her last menstruation having taken place six years before treatment.

Case VIII had, at the age of 24, menstruated only twice, once at 6, and once at 16 years, and had stained once, four months after marriage. There was a history of flushes. The left ovary was not palpable and the right was small and hard. A small sella turcica was present in this case. There was sexual anesthesia. This would indicate a very marked congenital maldevelopment of the genital tract, with ovarian deficiency. In this category may also be placed the 5 cases of oligo- and opsomenorrhea, which were markedly irregular from the first menstruation, and had the various uterine and ovarian stigmata of undeveloped or degenerated sex organs. Case XXIII was 30 years old. Her condition remained unchanged after treatment. Her irregularity began after a miscarriage seven years before treatment. In this case and in Case V, the cause of the failure was probably an old pelvic infection.

The history of Case XXVIII dates the oligo-opsomenorrhea from the last childbirth. As a result, she had at the next period severe cramps for 3 days, but the watery discharge for a day was same as usual. This patient had beginning fibrosis of uterus, and probably also in ovary. Two were treated for sterility. Case XXXIV, obese, with undeveloped uterus, narrow pelvis and sexual anesthesia, menses changed from a 1-day watery flow to a normal 4-day menstruation and she lost 30 lbs. In Case XXX menstruation was normal.

[Ovarian stimulation by *x*-ray is now generally admitted as an addition to our therapeutic armamentarium, but is not a method for very general use, especially by the roentgenologist. Ten per cent. of the castration-dose is the amount most commonly used.—Ed.]

800 Carcinomas of Uterus Treated by *X*-Ray. A statistical report from the Erlangen Clinic (1915-22) is rendered by H. Wintz[6]:

(6) Radiology, December, 1925.

Year	Cervix	Corpus
1915	42	(8)
1916	66	(8)
1917	90	(4)
1918	109	(14)
1919	108	(11)
1920	104	(20)
1921	91	(18)
1922	98	(7)

Year	Operable Cases		Inoperable Cases	
	Cerv.	Corp.	Cerv.	Corp.
1915	24	3	18	5
1916	14	3	52	5
1917	11	4	79	0
1918	18	7	91	7
1919	22	6	86	5
1920	12	9	92	11
1921	10	8	81	10
1922	12	2	86	5

He finds the following factors, in the order of their importance, are of decisive significance. The curative results of *x*-ray therapy depend upon: Exact medical radiation technic, based upon and carried out with accurate dosage. The minor variations of sensitiveness of different carcinomata are negligible. The kind, quality and degree of extension of the tumor to be treated (the earlier the diagnosis, the more favorable the result). The topographic location of the carcinoma (proximity of organs very sensitive to *x*-ray). The general living conditions of the patient, nursing care, feeding, proper medical attention after treatment. The "undisturbed retrogressive ability" of the carcinoma. The following are complicating unfavorable factors: Local infections; traumatic, chemical and physiologic-chemic (internal secretory) irritations. Severe constitutional diseases and profound psychic disturbances diminish the resistance against carcinoma. The as-yet-unknown tendency of the body towards carcinoma. (Absolute failures in apparently favorable cases in the initial state, in spite of accurate radiation technic, occur in 15 to 20%.)

[Radium is more reliable than *x*-ray in uterine cancer.—Ed.]

Radium

Changes in Ovaries After Radium Therapy. The patient operated on by M. Peugniez[7] had radium applied for bilateral ovarian cysts (30 millicuries) for supposed fibroma. Ovariectomy was then done. Examination of the specimens showed the walls of the cysts subjected to the most intense radiation had the tissue hyperelevated. Nearly all the primordial follicles had disappeared.

[Another example of the necessity of accurate diagnosis before subjecting a patient to radiation.—Ed.]

Radium Treatment of Fibroids. The results in 110 instances are set forth by L. D. Quigley[8]: There was no mortality and the results were most gratifying. The former cannot be looked upon as a mere coincidence, but rather as a sign that the treatment of fibroids has been improved upon. Surgical statistics the world over show 2 to 4% of the cases of fibroids operated on, die of one of the many complications that may be attributed directly or indirectly to surgery. In Quigley's series he feels 2 to 4 patients in the first 100 cases have been spared from surgical mortality. Shall we, therefore, continue to advise surgery to a class of patients in which we know that one in 25 to 50 perish —or shall we give them their best chances by a safer method and one so much less disabling.

Radium for Severe and Persistent Uterine Hemorrhage. Experience in 200 cases is recounted by S. Forsdike[9]: The cases were chosen for the following reasons: (1) The persistence of hemorrhage after prolonged medical treatment. (2) After curettage or other operation with no relief. (3) Advanced degree of anemia, with shortness of breath, headaches, edema of

(7) Gaz. des Hôpitaux, Dec. 2, 1925.
(8) Wisconsin Med. Jour., February, 1926.
(9) British Med. Jour., March 13, 1926.

legs, etc. (4) Cases in which the patient had to spend some part of each month in bed on account of the severity of hemorrhage. A large number (48%) had already been treated by dilation and curettage, of which 8 had been curetted twice, 4 three times, and 2 five times. Blacker records a case where the patient had been curetted 18 times. It seems hardly credible this could be repeated four, five and more times; nevertheless it is frequently done. It is reasonable to repeat it once where a patient has derived considerable benefit from it for months and is nearing the menopause, but there can be little reason for pursuing it beyond this point. Twenty had undergone some other operative treatment, including excision of polypi, amputation of cervix, resection of cystic ovaries, ventral suspension, salpingectomy, appendectomy, and myomectomy—the best results being relief for a few months, and the poorest no relief at all. One patient had been curetted, and, this proving of no avail, was subsequently given five exposures of *x*-rays, she improved for a few months, relapsed, and was then successfully treated by radium. Twelve spent the greater part of their time between bed and a couch. Some 38 were in an advanced degree of anemia through continuous loss. One had been treated palliatively and later by curettage; the bleeding did not stop and she was becoming seriously ill. The surgeon had had her prepared for hysterectomy, but radium treatment was carried out. After one exposure temporary relief occurred, and five months later a second exposure established amenorrhea permanently.

The sole absolute contraindication to radium in this condition is pelvic inflammation, and this is a very real danger, for the pelvis may become filled with an inflammatory tumor, the nucleus of which is a deeply seated abscess and the walls composed of uterus, bladder, and bowel, which renders any operation very difficult and pregnant with risk. Relative contraindica-

tions are patients bled white through loss of blood, where the red count is reduced by half, the leucocytes increased by half, and P. and T. warn us that patient is at a low ebb. In these cases Forsdike always keeps them in bed 2 to 3 weeks on a free diet, injections of iron, sodium cacodylate, and large quantities of lemon water to drink.

Chief among the causes of late recurrence are: (1) Septic foci, pyorrhea, etc.; (2) cystic ovaries; (3) pelvic inflammation; (4) high blood pressure associated with contracted kidneys. Recurrence at a late period (a year and more) at the menopausal age was found in 7 cases. One of these occurred two years after amenorrhea was established, and took the form of a blood-stained discharge; examination showed the cervix to be normal and the body of usual size. Some carious stumps with pyorrhea were found on routine examination; the former were removed and the discharge disappeared with a simple douche. Two more were associated with pyorrhea, and the hemorrhage ceased after removal of teeth. In two other cases the recurrence was associated with chronic nephritis and increased blood pressure. Two were associated with ovaries which had become enlarged and cystic. Apart from these there was no recurrence. Two of this group had been treated with two exposures to radium and one with three exposures. Recurrence in patients between 30 and 40 years of age took place in 10 cases, in 5 of which radium had to be used a second time, but they were more a continuation of the original hemorrhage than a recurrence. One, aged 35, had a recurrence after eight months and became normal; two (aged 32 and 37) after a year and became normal; one (aged 38) recurred after four months; and one (aged 39) after seven months.

[Radium will control uterine bleeding—and has a wide field, but again the diagnosis as to the cause must

be made and all cases with inflammatory histories excluded.—Ed.]

A New Screen and Introducer for Radon Tubes is described by Simpson and Flesher[1]: The screen consists of a hollow cylindric lead tube, which has a lumen just large enough to contain their radon (radium emanation) tubes. It can easily be bent to conform to the uterine canal, its flexibility being one of the important features. Screens may be made in various lengths and contain two to four or more radon tubes placed end-to-end. The screen containing two radon tubes is 5 cm. long, and each additional tube adds .75 cm. to its length. The wall thickness is 0.75 mm., the diameter

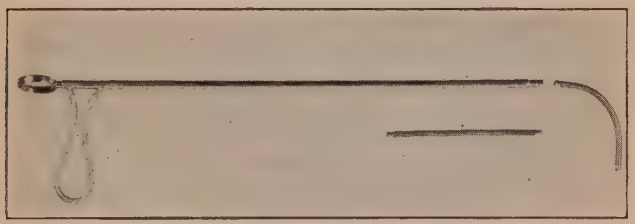


Fig. 44. Screen and introducer (Simpson-Flesher).

of the lumen being 2.5 mm., and the outside diameter 4 mm. Each end of screen is fitted with a nickel-plated brass screw cap, with an eyelet through which a strong silk thread may be passed.

Advantages: The screen can be bent and introduced usually without bringing the cervix down. The screen forms a radioactive rod of the desired length, so the whole uterine canal may be effectively irradiated. From 500 to 1000 or more millicuries may be used, the time of exposure being, approximately, 1 to 3 hours, depending on the quantity of emanation. In making intracervical applications in cancer of the cervix, dilation is seldom necessary. Trauma is thus minimized, and the danger of causing metastasis probably greatly

(1) Jour. Amer. Med. Ass'n., April 3, 1926.

lessened. The same type of screen and introducer may be used for radium salts, but the increased bulk of a screen containing large quantities of salts would be a serious disadvantage. The lead screen, on account of its flexibility, has been found useful in treating other cavities. The screen can be straightened by rolling between two wooden blocks. After it has been straightened a few times, it is liable to be broken, but this may be obviated by frequently using a new screen.

Radium in Cancer

Radium Treatment of Inoperable Pelvic Cancers. The extensive experience at the Radium Institute (Stockholm) is commented on by J. Heyman[2]: Their follow-up system is perfect, and every patient is reported on. (The cases referred to are only those primarily treated, postoperative recurrences are not included.)

Cancer of Cervix. During 1914-22, inclusive, 440 inoperable cases were treated; 234 of these (1914-9) were under observation in previous 5 years. Sometimes there are wonderful cures, even in inoperable and apparently hopeless cases. But in most we are only able to palliate, *i.e.*, cessation of bleeding, of vaginal discharge, and of pain, with ability of patient to work. The figures on degree and duration of the improvement of symptoms are based on 375 inoperable cancers treated at the Institute (1916-22). In nearly all bleeding has been stopped for longer or shorter periods. In nearly ⅔ the vaginal discharge has ceased, and in over 50% pain has disappeared. The freedom from symptoms has in over ⅓ lasted more than a year. The recovery of ability to work is perhaps the best indicator of the palliative results. ⅔ have regained strength to resume work; nearly half of those have remained able to work for more than one year, and ⅓ even for more than two years. It seems to be worth mentioning that only 38.4% of 375 patients with in-

(2) British Med. Jour., Nov. 7, 1925.

operable cancer of the cervix have not temporarily regained strength to resume work, and among these many were from the beginning considered hopeless. Of 234 cases from 1914-19, 39 have remained healed for five years or more—*i.e.*, 16.7% of permanent cures in these inoperable cases. It is not a very high percentage, but these cases would have been left as hopeless had not the radiologic treatment been adopted. These long-standing cures inspire to fresh exertions in spite of all disappointment.

Cancer of Corpus Uteri. No cases before 1915. From then to 1922, 54 examples (29 inoperable, 25 technically operable). Metastases were present in 10 of the inoperable ones—in 5 in the vagina only and in the other 5 in more distant parts. In the remaining 19 the surrounding tissues were infiltrated and the uterus fixed; 25 cases were technically operable. Contraindications to an operation were affections of the heart and the lungs, diabetes, old age, and a bad general condition (in 14 out of the 25), pronounced adiposity with- or without other complications in 11. Of the 17 cases which have been under observation for five years or more 10 remain free from symptoms after five years. But when it becomes possible to judge the five-year results of all the 54 cases, the percentage will be somewhat less. This is already evident for the two-year result for all the 54 cases, which shows 55.6% of all cases to be free from symptoms after two years.

Of the inoperable cancers of corpus after 5 years, 44.4% were cured. Here, too, with larger material, their 5-year results will most probably be nearer 30 than 40%. Of the 8 technically operable cases under observation for 5 years, 6 are still living. The worst result has been in the inoperable cases where there were evident metastases at the very start. Of these 10, only one was alive after 4 years. Since in cancer of the body metastases do not occur for a long time, hence those admitted with metastases are far advanced, and

nothing else can be expected. Of the cases of cancer of body, one inoperable is alive and free for 9 years, 3 technically operable, alive and free for 7 years; one inoperable alive and free for 6 years. One subject with technically operable cancer of body died from bronchopneumonia after being free for 7 years. At necropsy, all suspected glands and tissues were microscopically examined, but no trace of cancer found.

Cancer of Ovary. Inoperable cases here may, as regards prognosis after radium be divided into 2 groups: (A) "Inoperable," operation has either not been tried or merely exploratory; and (B) "Incompletely-Operated," most of the tumors themselves have been removed, but where it has been necessary to leave the metastases, often very extensive ones. The results of treatment of inoperable cases are not good. After a lapse of only one year but 25% can be considered free from symptoms. After 2 years only one case, and after 4 years none. The result in Group B is considerably more favorable—after 4 years 25% are free from symptoms, and after 5 years 21.4. The difference in the prognosis induced them some years ago to urge an exploration in every instance of inoperable cancer of ovaries, combined, if possible, with removal of tumor. Radium should be applied as soon as possible after operation. Of the incompletely-operated cases, one has been free for 10, and two for 9 years.

Cancer of Vagina. From 1911-22, some 16 patients were treated, even if operation was technically possible, the prognosis postoperative, is, as a rule, very unfavorable. (By "vaginal" cancer is here meant those with no other primary focus discoverable, and the vaginal portion of cervix, macroscopically normal.) Of these 16 subjects, one has been free for 3, another for 4, and two for over 5 years. In the last 2 the tumors were size of hen's egg.

Cancer of Vulva. From 1910-24, 64 cases. All far advanced, with great local tumors and palpable nodes.

Probably in a considerable percentage where a lasting cure has been obtained the condition was one of septic lymphadenitis, and not of cancer metastases. With regard to technic, their cases may be divided into 3 groups. The first comprises 8 cases, treated in 1910-13. The technic consisted at this time in a direct application of radium tubes to the surface of the tumor, to which the tubes were fastened by adhesive plasters. In none was freedom from symptoms attained. Owing to these unfortunate experiences they did not admit during the following three years any cancers of the vulva for treatment. In 1916 use was made of dental compound mass for the fixation of radium preparations. This has been worked out by Berven. During 1916-22 Berven treated 30 cases. Of these, 21 were improved for a short time or remained entirely unaffected, 3 were substantially improved for about three years, and in 6 freedom from symptoms was obtained. In one freedom from symptoms has lasted for 7 years, in one case, 6 years, in one 5 years (the patient later died of heart disease), in one case 4 years, in one 3 years, and one was free of symptoms for 2 years, when she died of heart disease. Thus freedom from symptoms for 2 years or more has been obtained in 20%.

However, it was found this form of treatment sometimes involved severe subjective troubles, and in a number severe secondary necroses. To avoid at least the primary reaction on the sloughing tumor and the surrounding infected tissue, Berven has since about 1923 first electrocoagulated the tumor and then immediately applied radium to the cleansed surface of the sore with considerably weaker doses. With this technic he has treated altogether 26 cases, of which one has remained free from symptoms for three years, 4 for two years, and 3 for one year. More important than this primary result with regard to a lasting cure is the palliative result that has been gained. In over half, in fact, local freedom from symptoms has been ob-

tained, and patients have been free from their very severe local troubles until death by metastases. In all cases the regional nodes have been treated with *x*-rays.

Method of Treatment. They use radium salt and employ, as a rule, Dominici tubes.

1. As a rule only 3 applications are made.
2. The second application is made a week after the first, and the third application three weeks after the second.
3. If possible, radium is applied at each of these treatments both in vagina and in uterus.
4. The duration of each application is about 22 hours.
5. A dose of 33.7 or 40.1 mg. element is used in the uterus three times, making a total dosage of about 2,220 to 2,640 mg. element hours.
6. A dose of 70 mg. element is used in the vagina 3 times, making a total dosage of about 4,500 mg. element hours.
7. The radium is always filtered through 3 to 4 mm. of lead.

Since 1919 a more concentrated treatment has been tried, the number of applications being reduced to two —32 and 24 hours respectively. In such cases the total vaginal dose has been limited to 4,000 mg. radium element. All intervention at commencement of the treatment, such as cauterization and excochleation is absolutely contraindicated. The treatment is never repeated within the first six months. If, six months after the three applications already mentioned, the growth has not disappeared, or if there is a recurrence, the treatment may be repeated, though they prefer not to repeat it until a year after the first treatment. Only one application is then made. Clinically cured patients, as well as patients with a suspected "reactive" inflammatory swelling, are not treated again until a recurrence has been definitely proved. If there is a local recurrence and the growth is operable, hysterectomy is performed. No difficulties in operating caused by the radiation have been noticed in these cases.

X-ray treatment is used on rare occasions only. They have abandoned the combined radium- *x*-ray treatment,

results were not better, but rather worse, than with radium alone. Nowadays they use *x*-ray treatment in conjunction with the first series of radium treatments in those cases only in which there are extensive glandular metastases from the very beginning. It is also used if severe pain persists after radium, and if there is a recurrence in parametrium. They do not employ the massive doses. On each field two or three exposures are made, each of one-third of an erythema skin dose, one exposure a day or every second day. The exposure is generally distributed on two anterior fields and one posterior field. With a filter of 0.5 mm. of copper and 1 mm. of aluminum.

This is the routine treatment of cancer of the cervix. The variation of the dose is very limited in different cases. They try to cover if possible the whole surface of the tumor with radium, and the size of the vaginal pack is for this reason varied according to the shape and size of the surface of tumor. In cancer of the body of uterus the same intrauterine dose is given as in the cervix. Since cancer of the body often produces metastases in the vagina, all cases of cancer of the body are also treated with application of radium in the vagina, the dose being only ⅔ of that used in the vagina for cancer of the cervix. The recurrences observed have nearly all appeared in the body of the uterus or its surroundings. Vaginal cancer is dealt with in the same way as the cervix—*i.e.*, by intrauterine treatment if possible. In ovarian cancer they give an intrauterine treatment, with about 40 mg. radium element for thirty hours, which is 1,200 mg. radium element hours, and this is directly followed by a series of careful *x*-ray treatments in small doses (3 x ¼—⅓ S.E.D.), from a number of small fields. If the tumor does not disappear or show a tendency to decrease, the ray is repeated at intervals of six weeks or more.

There is scarcely ever a contraindication to the radium treatment of cancer of the female pelvic organs. With

careful dosing even a far-advanced cancer in a very cachectic individual may be treated without injury. Finally, the fact must be emphasized that with radium, just as with surgical treatment, good results can be obtained only by a close study of patient, a proper knowledge of the limitations of the form of treatment, a carefully-planned technic, and experience. In the inexperienced the method involves great risks without any possibility of results comparable with those by operation.

[I saw Heyman's results this summer, and can subscribe to the accuracy of his follow-up—and the value of his technique.—Ed.]

Treatment of Cervical Cancer by Radium. At the Radium Institute (Paris) from 1919-23, some 362 cases were treated, and are analyzed by Cl. Regaud[3]: In 1919-20, six patients died of infection secondary to treatment; 236 succumbed to the growth after survivals of varying length. Nearly all with incontestable improvement and prolongation of life. Some 28 are alive, but not cured—three, 5 to 6 years; three, 4 to 5 years; two, 3 to 4 years; four, 2 to 3 years; sixteen, 1 to 2 years. On 3 occasions cure was had by hysterectomy, after radium failed. The number living and free from any signs is 95—eight, 5 to 6 years; seventeen, 4 to 5; thirteen, 3 to 4 years; twenty-one, 2 to 3 years; thirty-six, 1 to 2 years. The average of cures is 26.2%. This has been increasing yearly—1919, 9.1%; 1920, 19.3%; 1921, 29.5%; 1922, 34.4%; 1923, 43.9%. However, if we separate the cases absolutely inoperable (on account of the local extension) from those with doubtful- or certain operability (about 10% of whole) we get the following: Inoperable, 56.5% of whole number treated, 211 available for statistics—36 patients without any sign of cancer (about 17%). Of these 36 instances, three date to 1919; seven to 1920; four to 1921; eight to 1922, and fourteen to 1923. Cases of doubtful and

(3) Gaz. des Hôpitaux, March 10, 1926.

certain operability (43.5%) of whole number, 151 available for statistics, 59 patients without any sign (about 39%). Of these 59 instances, five date to 1919; ten to 1920; nine to 1921; thirteen to 1922, and twenty-two to 1923.

The present indications followed at Institute are: *(A)* Surgery is reserved for adenoepithelioma of cervix; cancers associated with inflammation of adnexa; failure of previous radiotherapy. *(B)* All other operable cases in good condition are subjected to uterovaginal radium applications, the author is convinced this is more efficacious than surgery. *(C)* This plan of radiumtherapy is reserved also for cases where the external segments of parametria are not involved. Here one must expect a rather large number of recurrences, due to distant metastases, and not detected. Regaud advises hysterectomy after radium, and not operating before any radium has been applied. Association of latter with *x*-rays is the choice when parametria are invaded.

Results of Radium Therapy in Cervical Cancer. The 60 cases, referred to by J. L. Ransohoff[4] were treated between 1912-21—Operable 7; borderline, 13; inoperable or recurrent after operation, 40. (Patients who could not be traced, are classed as succumbing to cancer.) Of the series, 6 are well (4 operable; 1 borderline, and 1 inoperable). Two others are worthy of comment:

VII. Aged 45. 1915. This patient was suffering from severe anemia. The cervix was replaced by an ulcerating carcinoma. The uterus was immovable. There was a small rectovaginal fistula, the result of a birth injury. This patient made a complete recovery, but returned in 1919, with a rectal stricture which was dilated under anesthesia. At this time no evidence of carcinoma could be found. In February, 1920, she was again operated upon, this time for symptoms simulat-

(4) Ohio State Med. Jour., September, 1926.

ing gallbladder disease. A subacutely inflamed appendix was found which was removed. The pelvic organs were carefully examined, and showed no evidences of carcinoma. This patient died in July, 1921, the cause of death unknown. VIII. Aged 54. 1915. Two years before a panhysterectomy done for cancer. Examination showed recurrence in the vaginal vault. Extensive radium treatment. A personal examination July, 1924, showed patient in good health, no evidence of carcinoma. One month later she developed obstruction of the bowels. An operation performed in her home town disclosed purulent peritonitis, cause undetermined.

The results of radium treatment of early carcinoma of the cervix are at least as favorable as those following operation. In contrast to the formidable operative procedure the method is safe and free from unpleasant sequelæ. It is probable more satisfactory results will be obtained in the future by combined use of radium and the ultrapenetrating *x*-ray.

[Radium results in cervical cancer are becoming more convincing every year.—Ed.]

Malformations

Atresia of Vagina. The patient under observation of A. A. Gemmell[5], aged 18, had never menstruated but had had periodic attacks of abdominal pain for 14 months. The attacks lasted a fortnight and occurred at monthly intervals. The pain felt in the sacral and hypogastric regions was so severe it caused vomiting, but was relieved by hot applications and brandy. The attack in which the patient was seen had lasted two weeks. She was poorly developed for her age. There were six digits on the right hand and each foot. The secondary sex characteristics were well developed.

(5) British Med. Jour., May 1, 1926.

There was a mass from symphysis to umbilicus, and the upper part of this felt like the body of uterus. The external genitals were normal, but what was at first taken to be a vaginal orifice with a hymen proved to be a patulous urethral orifice more posterior than normal; no vagina. Rectal examination confirmed the absence of vagina, and showed that the lower pole of the mass was cystic and extended to within about 2½ in. of perineum. A transverse incision was made below urethral orifice, but anterior to fourchette. Finally, the lower pole of mass was opened, and menstrual fluid escaped; at this point it was noted that pus escaped from urethra. A dilator was passed along the track daily, and menstrual fluid escaped with pus on one or two occasions. Five weeks later discharge from the track had ceased; there was still an abdominal swelling halfway up to the umbilicus, but nothing suggestive of a uterine body, and the whole mass was fixed. During this time there had been no menstruation and no attack of pain. On opening the abdomen, the bowels and omentum were found adherent to the abdominal wall and to one another, evidently shutting off the retained blood. These were separated with considerable difficulty, and during the process about 1 oz. of pus escaped from a pocket near right appendage. By further dissection the appendages were freed, the right from its normal position, the left from the bottom of pouch of Douglas. The tubes were found to be distended with blood, and the left open at its fimbrial end. The uterus was enlarged, soft, and retroverted, and below ended abruptly in a firm boss embedded in soft connective tissue. Hysterectomy was performed, but in attempting to enucleate what was thought to be the lower pole of the cervix from its bed it was accidentally cut through, and as the patient was suffering from shock, and all secreting tissue had been removed, no time was lost in completing the operation. The dissection from the perineum was found to have opened into the pouch

of Douglas, and this was kept open as a drain. On examining specimen it was found there was actually a small cap of vagina attached to uterus. On examination 4 weeks later, the perineal track was healed and there was a little thickening on the right side of pelvis. The patient was well and free from pain.

Gemmell said that absence of the vagina associated with hematometra, with or without hematosalpinges, was rare, and he had been able to trace only 14 cases in the literature. The commoner condition was complete absence of the genital tract or its presence in such rudimentary form as to preclude menstruation. In 7 cases hysterectomy was performed immediately; 5 had an artificial vagina formed, as some part of the vagina persisted and no postoperative complication was mentioned in any of the 12. In the remaining two perineal drainage was resorted to; one patient died, and the other recovered with suppuration.

[The Editor has seen but one case of absence of the vagina with functionating uterus and ovaries above. In this case an artificial vagina was made and lined with labial flaps, the cervix brought into the vaginal vault and attached. Satisfactory drainage has been established for nearly three years, though the vaginal lumen is very small.—Ed.]

Retention of Urine from Imperforate Hymen. Girl, of 14, admitted at 11 P. M., under the care of F. C. Hammond[6]: There was continual cramp-like pains in the abdomen and pelvis which had been increasing throughout the day. Her general condition had been apparently normal until about ten days previous, when she first noticed vague pains daily in lower abdomen. No attention was paid to these until late in the afternoon of the day of admission, when her physician was called in. The mother called his attention to a "bulging at the privates." A diagnosis was made of imperforate hymen, with a lower abdominal mass, and

(6) Atlantic Med. Jour., July, 1926.

Hammond saw her shortly after admission. On inspection, there was seen a pyriform enlargement, base up, from symphysis to umbilicus. Girl said she had not voided since going to bed the night before. Inspection of the vulva revealed an imperforate hymen, with marked bulging. Upon rectal examination, the vagina was found markedly distended, with the contents under great tension (hematocolpos). The posterior vaginal wall was pushed somewhat tightly into the hollow of sacrum. Catheterization and 34 oz. of urine evacuated, with immediate cessation of pain. Shortly after, went to sleep for the remainder of night. Operation next day. (Plate XXXVI.)

This was the 7th case seen by Hammond, and the only one in which the pressure of the hematocolpos was sufficient to cause retention of urine. It is not possible to determine when puberty was established, because patient was very insistent that she had not had any symptoms to cause her to suspect that menstruation was taking place. In fact, she was symptom-free until a week previous to admission. It may be a period occurred at that time, and the additional blood was the precipitate cause of the symptomatology.

[A similar case with resulting slough of the entire base of bladder was seen this year, ten days after drainage was established. Continuous pressure from a hematocolpos untreated was the cause.—Ed.]

Uterus Didelphys. The patient referred to W. A. Malcolm[7] for treatment was 29, and in 1st pregnancy. Six hours after admission had abortion. No rectal or vaginal examination. On the fifth day began to run T. and on the twelfth day had reached 103° at 4 P. M., and showed a typical septic curve. The introitus admitted two fingers easily. Cervix seemed soft and somewhat to right, although it was smaller than a normal cervix with such a past history. The fundus was enlarged and palpable to the expected size. A

(7) Amer. Jour. Obstet. and Gynecol., November, 1925.

hard mass (fist size) was to the left, and between it and the fundus was a soft fluctuating mass, half the size of former. It was considered a pelvic abscess with probable large tube or ovarian cyst on the left side. The patient was sent for vaginal drainage. After complete relaxation from anesthetic examination made. Externally, the labium minus on right ran up towards mons and fused with the labium majus on left: the cli-

Fig. 45. Uterus didelphys (Schematic).

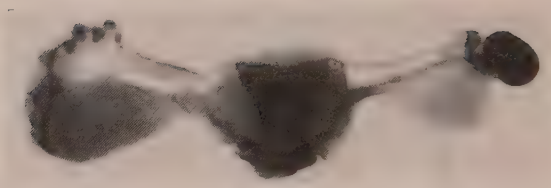
Fig. 46. Same case, vulvæ (Malcolm).

toris was in normal position but covered by a peculiar membrane from the labium majus on left side (Fig. 46). The vestibule seemed on first glance as otherwise normal, but a rather thick membrance extended from the anterior to the posterior wall of vagina. The membrane was loose and complete on both sides to the cervicovaginal portion, making two distinct vaginæ. The cervix on either side appeared complete, only some-

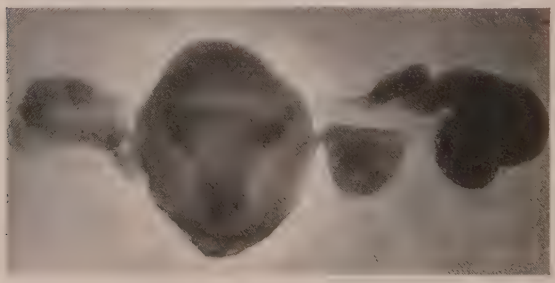
PLATE XXXVI.

Showing the marked bulging of the imperforate hymen. Hammond, page 562.

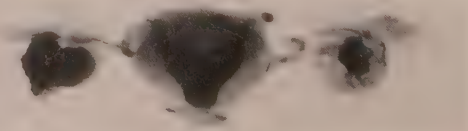
PLATE XXXVII.



Normal tubal course showing gentle direct curve through cornu with slight angulation. (Note distention of central portion.)



Diseased tubes with closed fimbriæ. Solution did not pass into tube, arrested in cornu. Density on right due to pus in tube. Incision into tube after injection showed no iodid solution in sac.

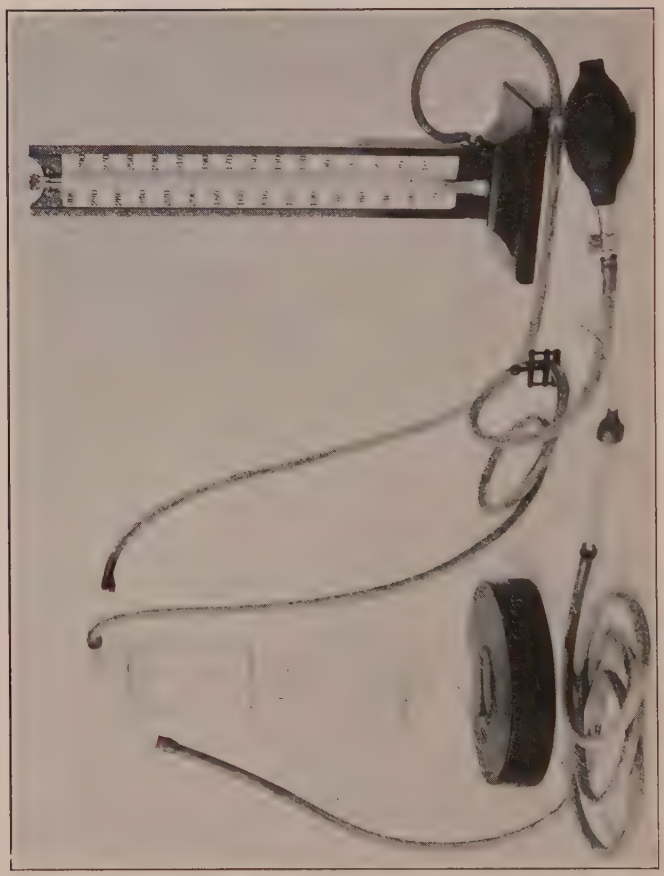


Diseased tubes. Right has closed fimbriæ. (Note collection of iodid solution just beyond intramural portion: occluded beyond.) Left side fimbriated end patent, but solution arrested by occlusive lesion in intramural portion.—Geist-Goldberger, page 565.

PLATE XXXVIII.

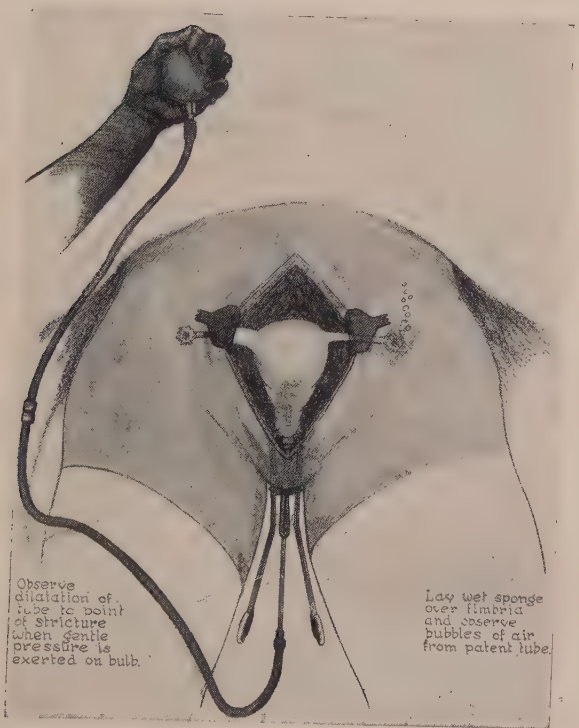
Instrument assembled for use.—Seides, page 568.

PLATE XXXIX.



Apparatus for tubal insufflation.—Graffagnino, page 569.

Instrument ready for use.


Observe dilatation of tube to point of stricture when gentle pressure is exerted on bulb.
Lay wet sponge over fimbria and observe bubbles of air from patent tube.

Instrument in place while laparotomy is proceeding. Bubbles of air arising around and through a wet sponge, as air leaves patent fimbriated end of tube (Schematic).—Miles, page 570.

what thinner and slightly smaller. However, the right was soft and partially dilated (Fig. 45). After opening through the posterior cul-de-sac of the left passage (the nonpregnant side) a bimanual examination was made. The fundus on the right was undergoing involution from the previous pregnancy and the adnexa seemed normal. The abscess was mesial to this fundus and posterior to the lower uterine segment. The left fundus was distinctly separated from the right; the adnexa were definitely outlined. Vaginal incision was made and the abscess was drained through the left orifice; a rather slow but uneventful recovery.

The only thing in the history of any interest was the menstruation changes. She began to flow at 15 years. Her periods were very irregular, lasting from five to six days over a period of 8 to 10 years. Then they started to become more regular but caused severe pains during the first 24 hours; then the patient would begin to flow well and the pains cease. This complaint has been present up to the time of pregnancy. She flowed from three to four days but comparatively less in amount than the average individual. At the present writing is regular, and occasionally has only slight pain at onset with average bleeding.

[We must always remember that uterus didelphys gives no symptoms until pregnancy or infection occur —then most unique developments take place. The drainage is always imperfect.—Ed.]

STERILITY

Intramural Portion of Tube As Regards Sterility. Geist and Goldberger[8] made a study of this portion both normal and diseased. They decide variations in the course of the intramural portion of normal tubes may offer a bar to impregnation. Intramural lesions

(8) Surg., Gynecol. and Obstet., November, 1925.

may make the passage of sperma or ova impossible. Such lesions may be present with- or without closure of the fimbriated extremity. One may get a positive or negative insufflation test in normal tubes, and in diseased tubes. A positive insufflation means tubes are patent to gas under pressure, not necessarily to spermatozoa or ova. It is essential to locate the occlusion in a case with a negative test if any reasonable hope of assistance from operative procedure is to be entertained. (In closing the authors refer to Kennedy's paper, 1925 volume, p. 538.) (Plate XXXVII.)

[This study shows the value of lipiodol injections in obscure cases of sterility.—Ed.]

Tuberculosis and Sterility. It is believed by P. Crevoisier[9], that this form of tuberculosis is growing more common. In the cantonal hospital of Aarau, (Switzerland) 19% of the adnexal tumors were found to be tuberculous. Heiman stated that in necropsies on females 1 to 1.5% show such lesions; this is nearly the same as at Aarau, where of 1860 patients treated since 1920, there were 34 with tuberculosis (1.8%). Age-incidence: 10-19, two; 20-29, nineteen; 30-39, eight; 40-49, five (married, 22; single, 12). Of the 22 married individuals, one with pulmonary manifestations refused operation, so it is not known positively there was tuberculous invasion of genitalia. During the same period, there were 54 admissions for sterility, hence the 21 for tuberculosis represent 40% of the total. The site-incidence in the 21 sterile married patients was—tubes, 17; uterus, 7; ovary, 4; peritoneum, 8.

Besides these 21 instances, there were 7 others in whom the clinical picture rendered tuberculosis a probable factor in the sterility, but histologic examination did not determine it. All had personal and family histories, fixed retroversion, inflamed and adherent adnexa. The histopathologic lesions here consisted merely of chronic endometritis or salpingitis, the

(9) Schweiz. med. Woch., Feb. 27, 1926.

characteristic nodules were lacking. If these be added to the other undoubted cases, we get tuberculosis as the cause of sterility in 50% of the patients.

[This is not so in our American women. Serial study of every tube removed shows less than ½ of one per cent. to be tuberculous.—Ed.]

Effect of Exposure of Male Organs to *X*-Rays. D. R. Hooker[1] undertook a series of experiments on white rats to ascertain the effect of exposure to the rays in reproduction. As a result he found while readily possible to produce non-motile sperm and aspermia as well as transitory infertility and sterility, it is quite impossible to standardize the exposures so as to foretell with any degree of certainty the effect which will be produced on the reproductive glands. This inability to obtain even approximately-consistent results indicates an extreme difference in individual resistance not hitherto recognized in studies of this kind.

Non-Specific Antigenic Effect of Spermatozoa. The purpose of the animal experiments by S. J. Fogelson[2] was to determine, if possible, a serologic explanation for sterility in the human which had no apparent anatomic or physiologic basis. Dittler, and others, report temporary induction of sterility in rats by sensitization with spermatozoa. Waldstein and Ekler describe in rabbits a definite Abderhalden reaction to testicular protein following coitus. Fogelson's object was to produce these antibodies experimentally in animals, to note their effect on a known existing fertility, and later to determine whether a similar sensitization to spermatozoa protein existed as a possible causative factor in human sterility. In addition he wished to determine: 1. Whether this effect were specific for species, *i.e.*, whether female animals sensitized by sperm of another species would give the same results as those sensitized by spermatozoa of the same species. 2. Whether ovulation was effected by this

(1) Amer. Jour. Roentgenol., October, 1925.
(2) Surg., Gynecol. and Obstet., March, 1926.

sensitization. 3. What mechanism caused this sterility, precipitins, agglutinins, lysins, or spermatotoxins. 4. What was the effect of sensitization upon females already pregnant.

In confirmation of others, he found conception can be temporarily inhibited by sensitizing the female rat to any spermatozoa protein. This antigenic effect is not specific; equally good results can be obtained from the spermatozoa of any species. The mechanism causing the sterility is still not clear, only precipitins being definitely present and their significance an unknown factor. These results cast no light upon the etiology of so-called "idiopathic" human sterility; they tend to eliminate protein sensitization as a causative factor. They do, however, suggest possibilities of supplying a contraceptive technic with a definite scientific basis and upon this further research is now being attempted.

A Simple Method of Determining Tubal Patency is described by S. Seides[3]: Besides a sphygmomanometer, one requires only a uterine canula, a T-tube, and rubber tubing. The blood pressure cuff is detached from sphygmomanometer, and the T-tube and canula connected with it. The bulb is worked in same manner as when one takes blood pressure. After the canula is introduced into the cervix and properly adjusted, the bulb is compressed very gently so the pressure rises only 5 to 10 points with each compression. After each compression the operator pauses a moment to note the rise of mercury. When the pressure reaches a height sufficient to open the tube (in patent cases) and cause the escape of air into the peritoneal cavity, the mercury begins to drop, and continues, until the pressure becomes equal to the resistance offered by the tube. At that point the mercury remains stationary. The bulb is now compressed again, driving the mercury up 10 to 20 points. When the bulb is released the mercury falls rapidly to its former height or a little lower. Another compression causes

(3) Surg. Gynecol. and Obstet., November, 1925.

a repetition of the previous occurrence. We are now confident that the patency of a Fallopian tube has been established. Although the first characteristic drop is manifest evidence the tube is open the two additional compressions introduce sufficient air to elicit the shoulder pain as confirmatory evidence of tubal patency. So small is the amount of air introduced that the shoulder pain does not appear until after patient has been up for several minutes This pain, though definite and unmistakable, is so mild that, as a rule, it does not interfere with the customary activities, and disappears entirely within 24 hours. It is understood that the cases thus tested are carefully examined to exclude conditions that contraindicate insufflation, and that strict asepsis is practiced throughout the procedure. (Plate XXXVIII.)

[An admirable method. The same result may be obtained by the use of a pipette passed through a rubber shoulder with a rubber bulb attached. Cary uses sterile saline solution instead of air—with patient in the knee-chest position.—Ed.]

Practically the same method is advised by P. Graffagnino[4]: At Charity Hospital (New Orleans) have used the Rubin test over 200 times, and find it all that is claimed. But the gas tanks and apparatus are difficult to transport. They used the various modifications proposed, but none could compare with the original Rubin procedure or obtain the maximum amount of information from test. For few months have used the method, illustrated, and have found the air does not cause any great inconvenience or discomfort, although it requires a longer period of time for absorption than carbon dioxid. The apparatus is portable, easily assembled, and can be used anywhere: home, office, clinics, operating rooms, etc. All that is necessary is a blood pressure apparatus, a perforated canula and a siphon flow-meter. The bulb of pressure apparatus

(4) Amer. Jour. Obstet. and Gynecol., November, 1925.

is used to force air through siphon into uterus, the pressure being recorded on the mercury column of the pressure apparatus, substituting air for oxygen or carbon dioxid. (Plate XXXIX.)

A Procedure for Determining Tubal Patency at Operation is introduced by J. E. Miles[5]: He finds by aid of the simple apparatus the patency of entire tube can be determined. Two 8-inch tenacula are secured to 2 metal cross-pieces through which passes a long steel canula. Latter has a rubber acorn-tip 2¼ in. from end, and a toothed ratchet-bar is attached. A metal collar $\frac{3}{16}$ in. wide slipped over canula is soldered to ratchet-bar 1.5 in. from end, and keeps rubber tip in place. The lower cross-piece holds the toothed ratchet-arm which is controlled by a spring. After fixing a connecting-tube to proximal end of canula, 4 feet of No. 22 rubber tubing are attached. There is a coupling at the center of said tube. At the other end of rubber tubing, a rubber bulb is fixed. The bulb, attached to the tubing, can conveniently be placed at a safe distance from the sterile field and so allow the nurse or assistant to manipulate it without breaking the technic: (Plate XL.)

The patient is put under an anesthetic. A weighted speculum is introduced and the cervix exposed and drawn down with an extra tenaculum forceps. The cervix is painted externally and well up into internal os with iodin solution. The canula is introduced under aseptic precautions into the cervix until the acorn tip is flush with external os. The lateral margins of cervix are now grasped by both tenacula of instrument and locked securely. The canula is then advanced in its ratchet a few notches so as to apply the acorn tip securely to the os and avoid any leakage of air. The extra tenaculum is then detached. The instrument is tested out to see if there is any leakage around the rubber acorn. If everything is secure, the abdomen

(5) Surg., Gynecol. and Obstet., July, 1926.

is opened. The tubes are exposed by surgeon and the assistant exerts gentle pressure on the bulb. If a tube is constricted in its interstitial portion, of course the tube will show no evidence of the pressure exerted from below, thus accurately diagnosing the tube as an impatent one. With this information, the surgeon can proceed with confidence and accuracy causing the patient a minimum loss of tissue and a maximum value from operation.

The method is a decided advance in the accuracy of diagnosis of patency of the tubes at laparotomy. It will aid the surgeon in deciding exactly how much of tube is to be resected, which decision, to date, has been at best haphazard. More women will be allowed to retain tubes or portions of tubes for future pregnancies. The Rubin test enables us to determine whether gas or air can be introduced through one or both tubes. The method described determines whether one or both tubes are open, or the site of constriction, at a time when conservative surgery can be applied. Tubes questionable, but definitely proved by the test to be closed might better be excised, and a possible nidus for future infection removed.

[This method has its most practical application when employed during operation on the tubes.—Ed.]

A New Instrument for the Rubin Test is introduced by J. A. York[6]: It has a comfortable handle, and a long, slender shank, which has at its distal end two prongs forming an angle of about 100° with the shank. The prongs resemble an ordinary tack-puller. The prongs fit astride the canula and behind the rubber stopper, so latter can be held firmly in external os without the least tiring of the hand and without injury to the stopper, which does not occur when a clamp is used.

Study of 400 Insufflations. This was made by J. A. Rongy[7]: Average age 27.4 years; extremes 22 and 41.

(6) Jour. Amer. Med. Ass'n., Aug. 7, 1926.
(7) Amer. Jour. Obstet. and Gynecol., May, 1926.

The average time of marriage in 257 patients with primary sterility was 4.3 years. The tubes were patent in 225; some 33 reëxamined and in 31 found closed. The pressure used in both instances was about the same; in fact, it was somewhat less during second examination. Most likely regeneration of the tubal structures took place and the points of obstruction disappeared.

Ninety-nine patients who suffered from primary sterility had severe menstrual disturbance; the flow was scanty and of short duration. They menstruated irregularly, at intervals of 6 to 18 weeks. In all the tubes

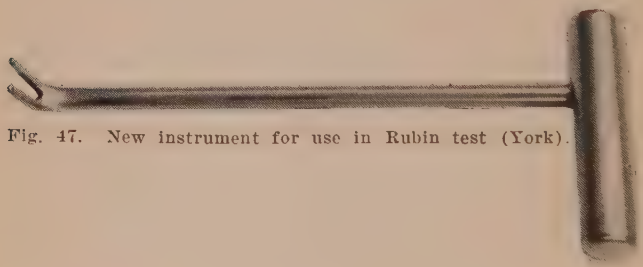


Fig. 47. New instrument for use in Rubin test (York).

were patent. Whether the functional disturbance is in the genital organs, or the malfunction of the genital tract is only a local manifestation of a constitutional disturbance, we as yet do not know. No form of medicinal treatment improves or cures this type. The organic extracts proved to be valueless in the treatment of sterility.

The average rise of the mercury column in patients whose tubes were open was 131. The average rise in patients in whom the tubes were closed was 197. They seldom allow the column to rise above 220. We have as yet no means of knowing where the points of obstruction are located. If the occlusion is at the middle or distal portion of the tube, too much pressure of the gas may tear the soft parts. There is less danger of trauma

if the occlusion is at the cornua. Occasionally pain may indicate the points of occlusion. If the maximum intensity is in inguinal regions, the probability is occlusions are in the outer portions of the tubes. If in the middle hypogastric region, the probability is the occlusions are at the cornual ends of the uterus and the pain is caused by overdistention of uterus. Whenever a patient complains of great pain in inguinal regions, they never allow the pressure to continue.

In 142 patients the tubes were found closed. Thirty-three were reëxamined, and in 3 the tubes found open. The majority suffered from relative sterility and gave a history of infection, which evidently had developed insidiously as a result of childbirth or miscarriage. In some the tubes were found to be thickened; still, clinically, they could not be classified as suffering from pyosalpinx. Fourteen patients had been operated upon for ectopic pregnancy, and upon examination the remaining tube was found closed. This would seem to indicate that infection plays an important part in the etiology. The mechanical irritation produced by the clots in pelvic cavity and the manipulation entailed in the operation may cause a reaction in the pelvis which obliterates the lumen of remaining tube.

Three, in whom the oviducts were found closed, became pregnant subsequently. Since then they are guarded in their prognosis. It is difficult to state whether it was spasm of the tubes which prevented the passing of gas or whether actual obstruction existed, which disappeared later. Nine patients suffered from intramural fibroids. The tumors must have interrupted the continuity of the genital canal and prevented the gas from passing. Three patients who had been operated upon for suppurative appendicitis, the wounds having been drained, were found to have the tubes closed. The practice of some surgeons of inserting drain into the pelvis evidently produces sufficient reaction about the viscera to cause the closure of the tubal canals.

(Surgeons must keep this fact in mind when operating for suppurative appendicitis in unmarried women). Patients with dysmenorrhea were not improved by the insufflation. Their experience does not coincide with those who found some suffering from less pain during menstruation as a result of this examination. In two, who had had plastic operations on the tubes for the cure of sterility, it was attempted to insufflate the tubes during convalescence, to prevent postoperative occlusions of the repaired tubes. They soon abandoned this procedure because it was annoying. These patients were subsequently insufflated and tubes found closed.

J. O. Polak, in opening the discussion, said: "While this procedure is of great diagnostic confirmatory value, it is not free from danger. I, too, have had severe cases of syncope following its employment. These tests should not be done as routine in the office. It is definitely a surgical procedure, and premorphinization adds very materially to the facility with which it may be done. Not infrequently the interstitial portion of the tube, running as it does through the musculature of the uterus will shut down and no gas passes at 200 under the first pressure. It is well to stop and not repeat the test. In a little while, the gas will pass through at a pressure of perhaps 120. In other words, there is the same come-back in involuntary muscle that there is in any other structure that is assaulted.

It is unwise to tell any woman after we have been unable to pass gas through the tube that she cannot become pregnant. I have had the chagrin this year of receiving three letters from patients telling me they had come a great distance to get my opinion and to learn that their tubes were closed, and that later a country physician had with little treatment succeeded in mak ing it possible for them to become pregnant.

These tubes that we are inclined to take out during the acute stage may get well later, and I have seen

women of supposed sterility who have borne children, after 18 to 20 years.

Another point I wish to impress is that no case with cervical discharge should be insufflated.

The doctor stated that no operation on a cervix cures sterility. The exception is the immense vaginal hypertrophies; in those cases amputation does cure in a fairly large number.

I would call attention to the value of Kennedy's work which is the injection of an opaque substance into uterus and tubes and then the *x*-ray locating the point of obstruction. Personally, I cannot see any advantage in salpingostomy. It is better to tie a piece of catgut around the tube and Nature takes care of it better than the plastic procedure; those are the only cases in which I have gotten satisfaction.''

Tachycardia Following Rubin Test. The patient, under care of another physician, had air injected, which apparently entered abdomen without obstruction. The amount was not measured but thought to be no more than one or two ordinary hand-bulbs. About an hour later, she was suddenly seized with pain low in left chest and in left side of neck. The pain was intense and made much worse by breathing. At the same time there began marked palpitation. She made her way back to the office, not far distant. On being summoned from a neighboring office, R. A. Kern[8] found the patient in obvious distress, face flushed and breathing short and jerky. The heart action was rapid and tumultuous, but P.(152) of good quality. The heart was normal in size, the sounds of good quality in spite of tachycardia, and no murmurs. Since the pelvic examination had been negative and there were no lung signs, a lung embolism was considered unlikely. Because of the abrupt offset in heart rate from 152 to about 76, a change that required only a second or two, it seems justifiable to identify the circulatory disturbance as a paroxysmal tachycardia,

(8) Jour. Amer. Med. Ass'n., Feb. 27, 1926.

even though no graphic confirmation was available. Its occurrence in association with air under the diaphragm and its relief immediately following a shift of the air from beneath the diaphragm justifies the assumption the tachycardia resulted from the air bubble, probably a reflex effect.

The occurrence after the Rubin test of the type of pain described is frequent, but Kern has no knowledge of a paroxysmal tachycardia under the same circumstances. It is significant, however, that this rather severe circulatory disturbance occurred in a person with no evident preëxisting cardiac disease. It is conceivable that a similar attack might result more easily with a heart already injured, *e.g.*, the seat of widespread myocardial disease, and in that case might bring with it serious or even fatal consequences. Hence this record, as a caution against aïr in this test instead of carbon dioxid, as recommended by Rubin. The nitrogen, constituting 77% of the injected air, remains unabsorbed for many hours, whereas carbon dioxid will be absorbed in a comparatively few minutes. The carbon dioxid offers but little greater difficulty and will be a safeguard.

[The Rubin test is not an office-procedure.—Ed.]

Treatment. A series of 510 cases are analyzed by J. A. Van Dongen[9] seen by him in previous decade: In 2 of 4 cases in which the sterility was of 10 to 15 years' standing, conception followed in four or five months after dilation of the cervix and curetting, after 24 hours of laminaria. He warns against insufflation of the tubes or injection of a contrast substance, and against Ott's method of injecting charcoal into the abdominal cavity, regarding them as potentially dangerous and unreliable. He cites Schwarz' report of 226 instances of childless marriages in which conception finally occured in from 68 to 13.8%, without extraneous interven-

(9) Tijdsch. v. Geneesk., (quoted in Jour. Amer. Med. Ass'n., Sept. 11, 1926).

tion, while the proportions were 66.6 to 14% in 74 other patients treated by dilation of the cervix. Van Dongen insists that our task is to improve the present crude methods of examination and treatment, and trust more to Nature. No marriage should be labeled sterile until after 3d year.

[Active surgical measures on the cervix do not cure sterility. The cure is incidental—each case must be individualized.—Ed.]

Sterility With Amenorrhea Relieved by *X*-Ray. The association is not uncommon, I. C. Rubin[1] found it 74 times in 1450 consecutive instances of sterility. Pregnancy takes place in about 5.5% of the untreated cases. In 9 out of 12 cases treated with mild doses of *x*-ray, pregnancy resulted. Only one of these patients aborted. The rest carried to full term and gave birth to normal children. *X*-ray irradiation of the ovaries resulted in restoration of the menses in 11 of 12 cases of amenorrhea. *X*-ray irradiation of the hypophysis area and the thyroid appears to have an adjuvant value. Two of the pregnant and 2 of the nonpregnant cases received hypophyseal irradiation. One of the pregnant cases also received thyroid irradiation.

Peruterine tubal insufflation and endocrine therapy are additional aids to the *x*-rays in amenorrhea with sterility.

As the ovaries were found to be definitely enlarged in 8 of the 9 successful cases treated with *x*-rays, careful examination with regard to this point may prove of aid in selecting the cases of amenorrhea associated with sterility suitable for ovarian stimulation. When no enlargement is found, irradiation to the hypophyseal area or the thyroid, etc., may be more advisable and should certainly precede irradiation of ovaries.

[This suggestion has a clinical value.—Ed.]

Surgical Treatment is considered by A. Mayer[2]: (*A*) On 2 occasions he reimplanted the tube in uterus,

(1) Amer. Jour. Obstet. and Gynecol., July, 1926.
(2) Münch. med. Woch., Oct. 16, 1925.

first done by the late T. J. Watkins (1897) later by 9 others, with 2 successes. The principal indications are: 1. Myomas of tubal angle; 2. ectopics where whole tube cannot be preserved; 3. affections where the tubal lumen is patent only in interstitial or isthmic segments; 4. congenital occlusion of tubal opening into uterus.

(*B*) Following many others, Mayer transplanted the ovary into uterus. Lately the tube itself has been made use of, ovary placed at circumference of fimbriated end. If the segment of tube remaining is very short, it may be possible to surround ovary with a fragment of omentum. Mayer refers to the work of French observers, especially Tuffier, who transplanted the ovary into uterus after excision of both tubes. No conception followed, but of 2 ovaries removed later on, there was a recent corpus luteum in one proving the organs were functioning normally. Mayer found other observers had 6 successes, 3 full-term pregnancies and 3 abortions. From a technical standpoint, one can turn the ovary into uterus, preserving the ovarian ligament, or make a free transplant. In the former, the vasculonervous connections are preserved, thus favoring its vitality; on the other hand, the organ is made taut by its ligament, and again, there may be a uterine fistula. The 2d plan avoids the risk of rupture during pregnancy, with maximum of chances of success owing to the presence of the whole ovarian surface in the uterus. But it is less well nourished and during pregnancy may necrose and be expelled. To preclude definitive amenorrhea in case of failure of the graft, Mayer suggests making a partial ovariectomy, one portion being left *in situ*, and the rest grafted into uterus.

[The success of all such procedures as referred to by Mayer, depends on the absence of infection, the perfection of technique and the quality of the conserved structure.—Ed.]

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